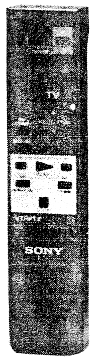
SLV-X1/X1ME/X1PS/X3/X3ME/X3PS

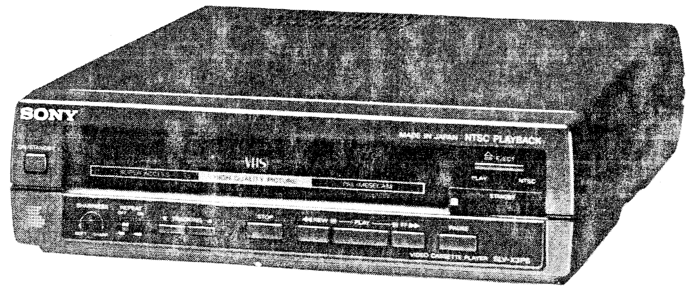
RMT-V100B

SERVICE MANUAL

ME Model
SLV-X1/X1ME/X3/X3ME
E Model
SLV-X1PS/X3PS



Remote commander RMT-V100B is available as a unit, but as individual parts the battery case lid of commander is only available.



This photo is SLV-X3PS.

SPECIFICATIONS

Format	VHS standard
Video signal	CCIR standards, PAL and MESECAM color systems
Tape speed	23.39 mm/sec.
Fast-forward and rewind time	Approx. 4 min. 15 sec. (T-120)
Antenna	75-ohm antenna terminal for VHF/UHF
RF converter output	UHF channels 30 to 39 (SLV-X1ME/X3ME) VHF channels 3 or 4 (SLV-X1/X1PS/X3/X3PS)
LINE OUT	VIDEO OUT (phono jack) (1) output signal: 1.0 ± 0.2 Vp-p, 75 ohms ± 5 ohms AUDIO OUT (phono jack) (1) output level: –8 dBs output impedance: less than 10 kilohms
Power requirements	110 – 127/220 – 240 V AC, 50/60 Hz
Power consumption	23W
Dimensions	Approx. 290 × 85 × 330 mm (w/h/d) (11$^{1}/_{2}$ × 3$^{3}/_{8}$ × 13 inches)
Weight	Approx. 4.3 kg (9 lbs 8 oz)

Remote Commander

Remote control system	Infrared control
Power requirements	3V DC, two R6 batteries
Dimensions	Approx 40×18×175 mm (w/h/d) (1$^{5}/_{8}$ × $^{23}/_{32}$ × 7 inches)
Weight	Approx. 59 g (2 oz.) (not including batteries)

Accessories supplied

Remote Commander with two R6 batteries (1)
75-ohm coaxial cable with DIN type connector (1)
AC power code (1)
AC plug adaptor (1) (SLV-X1/X1ME/X3/X3ME)

Design and specifications are subject to change without notice.

VHS VIDEO CASSETTE PLAYER

MICROFILM

SONY ®

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splasher and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
4. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
5. Check the B+ voltage to see it is at the values specified.

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

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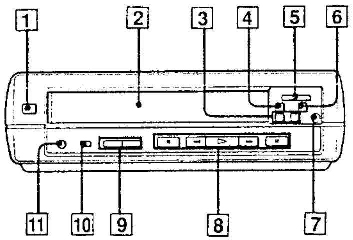
Location and Function of Parts and Controls

Refer to the pages indicated in ● for details.

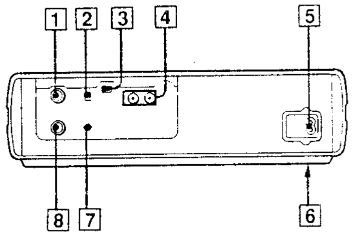
Front Panel



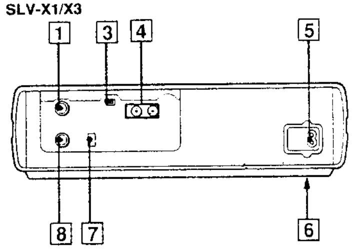
1. **ON/STANDBY switch**
2. **Cassette compartment**
3. **ON/STANDBY indicators**
4. **► PLAY indicator**
5. **≙ EJECT button ❾**
6. **NTSC indicator (SLV-X3/X3ME only)**
   When the tape recorded in the NTSC system is played back, the indicator lights.
7. **Remote sensor**
8. **Tape transport buttons**
   ■ STOP, ◄◄ REW (rewind), **► PLAY,**
   ►► FF (fast-forward), **II PAUSE**
9. **TRACKING ▼/▲ button ⓫**
10. **REPEAT ON/OFF switch ⓫**
11. **SHARPNESS control (SLV-X3/X3ME only) ⓫**
    Use to adjust the sharpness of the picture if necessary.
    Normally set the control at the center detent position.

Rear Panel

SLV-X1ME/X3ME

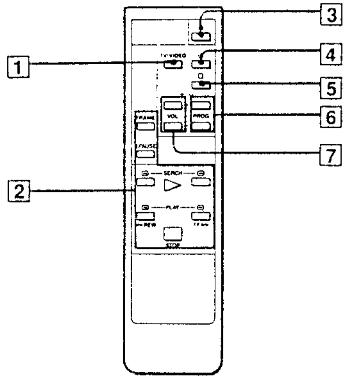


SLV-X1/X3



1. **AERIAL IN connector**
   Connect the aerial cable.
2. **TEST SIG. (signal) ON/OFF switch ❼**
   (SLV-X1ME/X3ME only)
   Set to ON to obtain the test pattern for adjusting the TV so that it can receive the signal from the player.
3. **COLOR SYSTEM switch ❽**
   Select the color system.
4. **LINE OUT VIDEO/AUDIO jacks (phono type)**
5. **AC IN (input)**
   Connect the supplied AC power cord.
6. **Voltage selector ❻**
7. **RF CHANNEL selector**
   SLV-X1ME/X3ME ❼
   Used to adjust the channel for the player, from 30 to 39.
   SLV-X1/X3 ❽
   Used to select the channel for the player, CH3 or CH4.
8. **AERIAL OUT connector**
   Connect to the aerial input of the TV receiver using the supplied cable.

Remote Commander

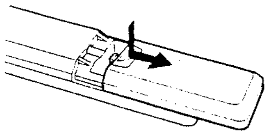


1. **TV/VIDEO button**
   Press to select the input signal on the TV.
2. **Tape transport buttons**
   II► FRAME, II PAUSE. ⊖ / ⊖ SEARCH (reverse/forward), **► PLAY, ◄◄ REW** (rewind), **■ STOP,**
   ►► FF (fast-forward)
3. **⏻ (power on/standby) switch for the player**
   Press to turn on or off the player.
4. **⏻ (power standby) switch for the TV**
   Press to standby the TV.
5. **⊂ (power on) switch for the TV**
   Press to turn on the TV.
6. **PROG (program) +/– buttons**
7. **VOL (volume) +/– buttons**

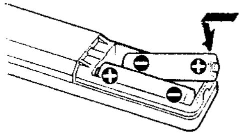
Function of the 1 and 4 to 7 buttons
These buttons can be used to remotely control Sony TVs with the 🅱 mark.

Battery Insertion

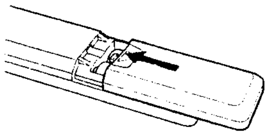
1 Open the lid.



2 Insert two R6 (Size AA) batteries with the polarity lined up correctly.



3 Close the lid.



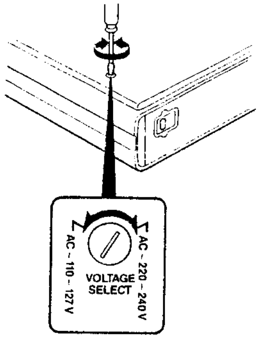
Notes on the handling of batteries
- With normal operations, the batteries will last for approximately 6 months.
- If the Commander will not be used for a long period of time, remove the batteries to avoid possible damage from battery leakage.

SECTION 1
GENERAL

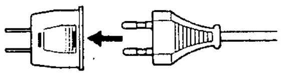
This section is extracted from instruction manual.(SLV-X1/X1ME/X3/X3ME)

Operating Voltage Adjustment

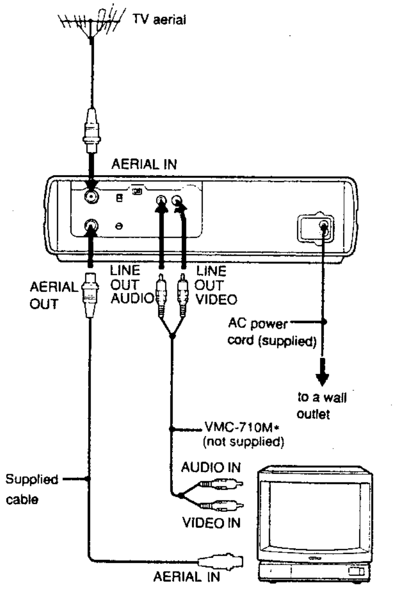
This unit operates on either 110–127 or 220–240 V AC. Before plugging the unit into a wall outlet, make sure that the voltage selector on the bottom of the unit is set to the local power line voltage. Change the position of the selector, if necessary.


AC - 110 - 127V
VOLTAGE SELECT
AC - 220 - 240V

Use of the supplied AC plug adaptor
If the plug does not fit in the wall outlet, use the supplied AC plug adaptor.



Connections


TV aerial
AERIAL IN
AERIAL OUT
LINE OUT AUDIO
LINE OUT VIDEO
AC power cord (supplied)
to a wall outlet
VMC-710M* (not supplied)
AUDIO IN
VIDEO IN
Supplied cable
AERIAL IN

- Turn off the power of the unit and TV.
- Do not connect the AC power cord until all of the connections are completed.
- Connect firmly since a loose connection may cause picture distortion.

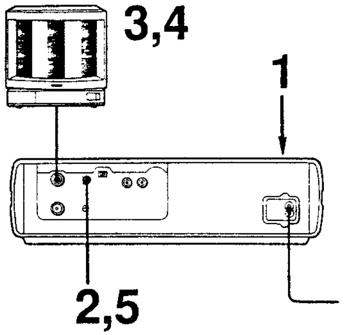
If your TV is equipped with video/audio input jacks, connect it to the player's LINE OUT VIDEO/AUDIO jacks to view a higher quality picture. To watch the playback picture, set the TV/VIDEO input selector on the TV to VIDEO.

* If a TV has the AUDIO L and R jacks, use a commercially available connecting cable like a Sony VMC-910MS.

Adjusting the TV

Your TV must be adjusted to receive the signal from this unit. If you connect a monitor or a TV equipped with video/audio input jacks, skip this section.

SLV-X1ME/X3ME



1 **After making the connections, press ON/STANDBY on the front.**

2 **Set TEST SIG. to ON with a ball-point pen or similar object.**
The test signal is transmitted on a channel between UHF channels 30 and 39.

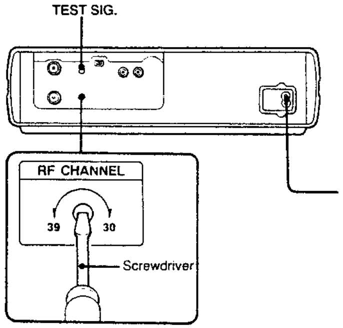
3 **Turn on the TV and select a program position which is not being used to receive a TV station.**

4 **Tune the channel until you see a clear test pattern on the TV screen and you hear a continuous tone.**

5 **Set TEST SIG. to OFF.**

Whenever you use this unit, you should set the TV to the program position selected in this adjustment.

If the test pattern is not free of disturbance


TEST SIG.
RF CHANNEL
39
30
Screwdriver

1 Reset TEST SIG. to OFF.

2 Adjust the channel of the TV to a channel between UHF channels 30 to 39 so that the TV screen shows no picture and so that no sound is heard.

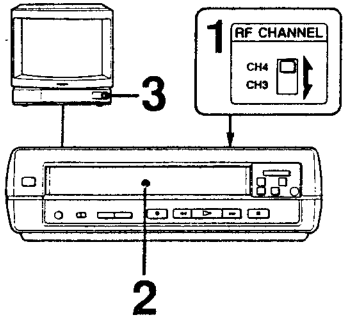
3 Set TEST SIG. to ON.

4 Turn RF CHANNEL slowly until you see an undistorted test pattern on the TV screen.

5 Set TEST SIG. to OFF.

Setting the Color System

SLV-X1/X3

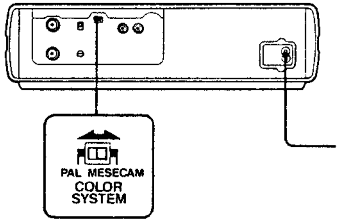


1 Set RF CHANNEL located on the rear to CH3 or CH4 with a ball-point pen or similar object, whichever channel is not active in your area.

2 Insert a recorded cassette .
Playback will start automatically.

3 Turn on the TV and set the TV to the VHF channel to correspond to the RF CHANNEL setting.

If a picture does not appear or the playback picture is not clear, fine-tune the channel on the TV.



For SLV-X1/X1ME
The unit plays back tapes recorded on the PAL or MESECAM system.

For SLV-X3/X3ME
The unit plays back tapes recorded on the PAL, MESECAM or NTSC system. Tapes recorded on the NTSC color system can be viewed on a TV based on the PAL (B/G) color system.

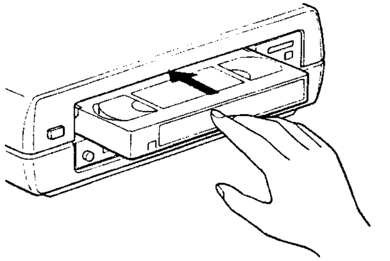
When tapes recorded on the NTSC color system is viewed on the multi color system TV, even if the color system of the TV is set to AUTO, the color system may not be set to PAL automatically.
Before you play back the tape, set the color system of the TV to PAL.
When a tape recorded on the NTSC color system is played back, the NTSC indicator lights.

Note
If your TV does not conform to the color system of the tape to be played back, you cannot view the playback picture.

Handling Video Cassettes

Inserting a Cassette

Insert a cassette by gently pressing the center of the back of the cassette.
The power will be turned on automatically.

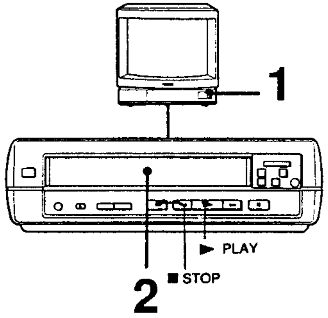


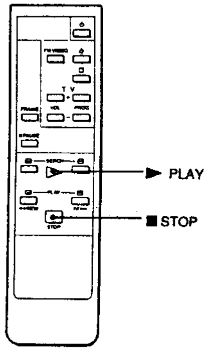
Ejecting a Cassette

Press ≜ EJECT.
When the power is off and ≜ EJECT is pressed, the player is turned on automatically and the cassette is ejected. After which, the power is turned off automatically.

Operation

Playback





Playing back a Tape

The unit plays back a tape recorded in the SP mode only.

1 **Turn on the TV and select the program position for the player or select the input for the player.**

2 **Insert a cassette.**
The power is turned on and playback is started automatically.
The ► PLAY indicator lights.
(For SLV-X3/X3ME, when the tape recorded on NTSC is played back, the NTSC indicator lights.)

Stopping playback
Press ■ STOP.

Playing back again
Press ► PLAY.

Note
When the tape recorded on NTSC color system is played back, the black bands appear at the top and bottom of the picture.

To view the TV program
Turn off the power of the player.

To advance the tape rapidly.
Press ►► FF.

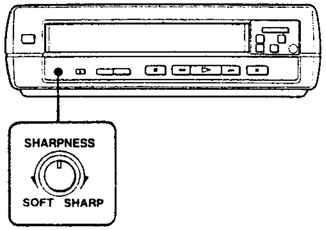
To rewind the tape.
Press ◄◄ REW.

When the tape is played back or advanced rapidly to the end
The cassette will be automatically ejected after it has been rewound to the beginning (when REPEAT ON/OFF is set to OFF.)
The power remains on.

Note
Sufficient picture quality may not be obtained when playing back tapes with unsatisfactory recording.

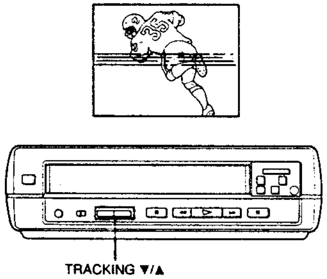
Adjusting the Sharpness of the Picture

SLV-X3/X3ME only



SHARP: To get a sharp picture
SOFT: To get a soft picture

If Streaks or Noise Bands Appear



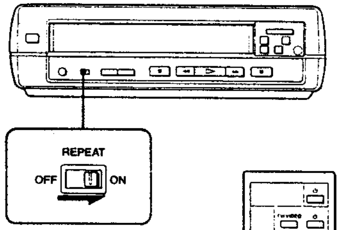
Adjust TRACKING ▼/▲ so that the streaks or noise bands in the picture are reduced.

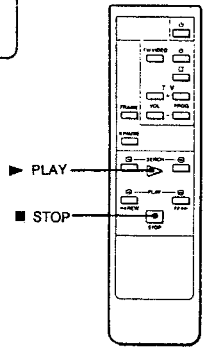
To return to the tracking center position
Press both ▼ and ▲ buttons simultanously.

When a prerecorded tape with the copyguard system is played back
The intermittent distortion may appear in the upper portion of the picture. However it is not failure of this unit.

Repeat Play

When REPEAT ON/OFF is set to ON, the tape is repeatedly played back from the beginning of the tape to the end.





To stop repeat play
Press ■ STOP.

To start repeat play again
Press ► PLAY.

To release the repeat function
Set REPEAT to OFF.

Locked Picture Search

You can watch the picture while fast-forwarding or rewinding the tape.

During normal playback
Press ⊖/⊖ SEARCH on the Remote Commander.
To resume normal playback, press ► PLAY.

Picture Search

You can watch the picture at high speed as long as the specific button is kept pressed.

During normal playback
Press and hold ►► FF or ◄◄ REW.
When you release the button, normal playback will resume.

During fast-forwarding the tape
Press and hold ►► FF.
When you release the button, the tape will be fast-forwarded again.

During rewinding the tape
Press and hold ◄◄ REW.
When you release the button, the tape will be rewound again.

Playback Pause Picture

Press II PAUSE during normal playback.
To release the pause mode, press ► PLAY or II PAUSE.

Note
If the playback pause mode lasts for more than approximately 5 minutes, the player enters the stop mode automatically.

Frame-by-Frame Picture

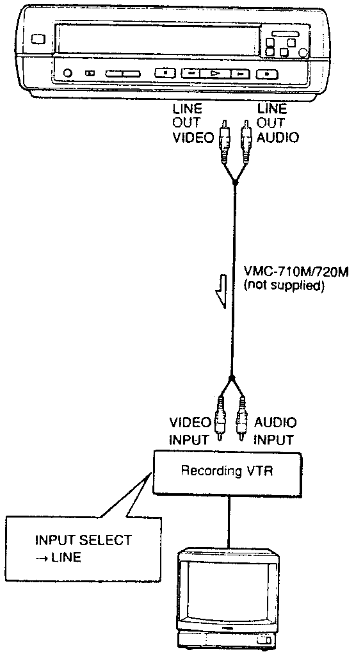
Press II► FRAME on the Remote Commander in the pause mode.
Each time the button is pressed, the picture advances by 1/5 frame.If you keep pressing the button, the picture advances one frame every one second.

Editing

Tape Editing

To edit a home movie tape, you need video cassette recorders.

Editing Home Movie Tape onto Another VTR



Operation

1 Insert a recorded cassette into this player.

2 Search for the playback start point and enter the playback pause mode.

3 Search for the recording start point and enter the recording pause mode.

4 Press the PAUSE button on both of the units. Recording of the signals from the player will start.

Note
Tapes recorded on the NTSC color system cannot be edited onto another VTR.

If the other VTR has audio L and R jacks, use a commercially available connecting cable like a Sony VMC-910MS/920MS.

SECTION 2
DISASSEMBLY

2-1. REMOVAL OF UPPER CASE

It is widen on both sides the back of upper case and remove up direction.

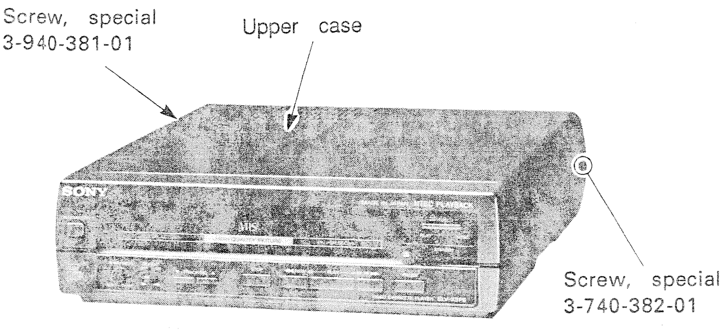

Screw, special
3-940-381-01
Upper case
Screw, special
3-740-382-01

Fig. 2-1

Then remove the upper case.

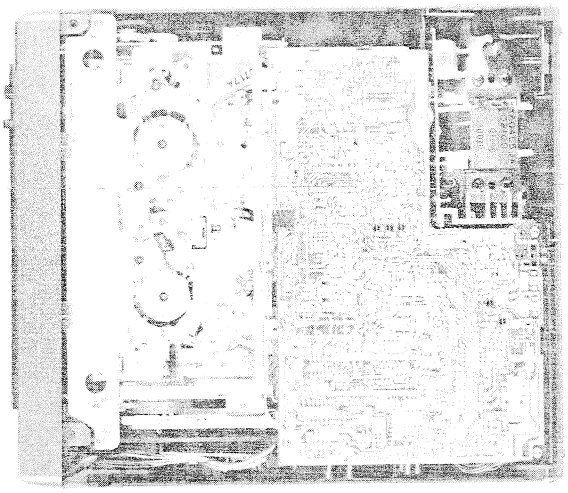


Fig. 2-2

2-2. REMOVAL OF BOTTOM PLATE

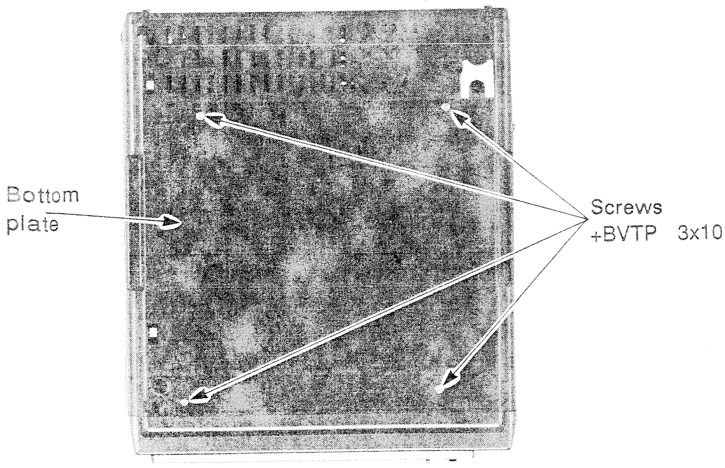

Bottom plate
Screws
+BVTP 3x10

Fig. 2-3

Then remove the bottom plate.

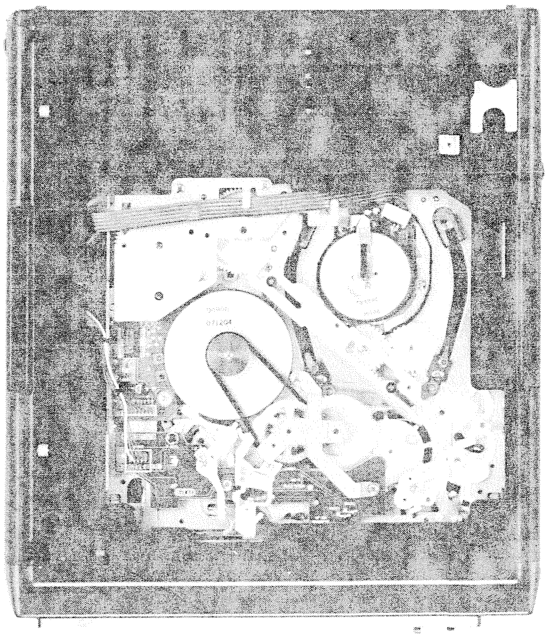


Fig. 2-4

2-3. REMOVAL OF FRONT CABINET

Then remove the upper case, and screws (+BVTP 3x10), and raise up the claws (two places) front cabinet as shown by Fig. 2-5, and remove front cabinet in the arrow direction.

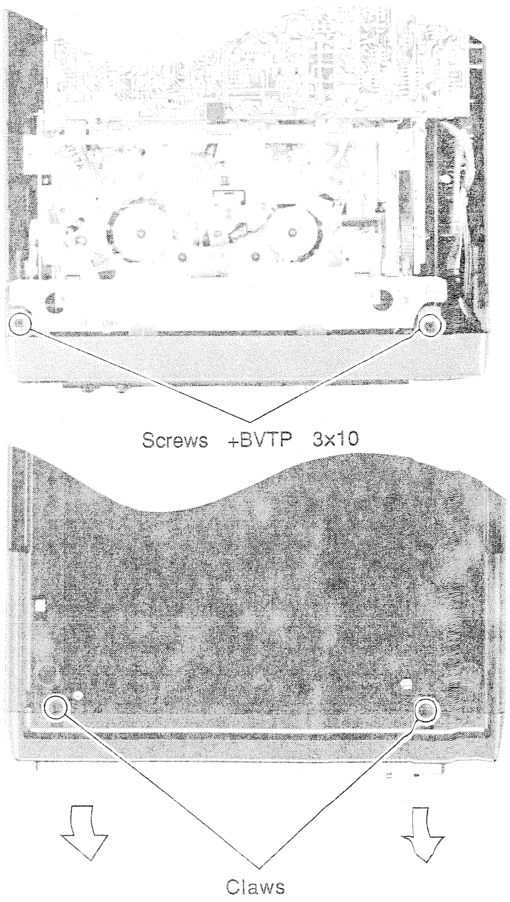
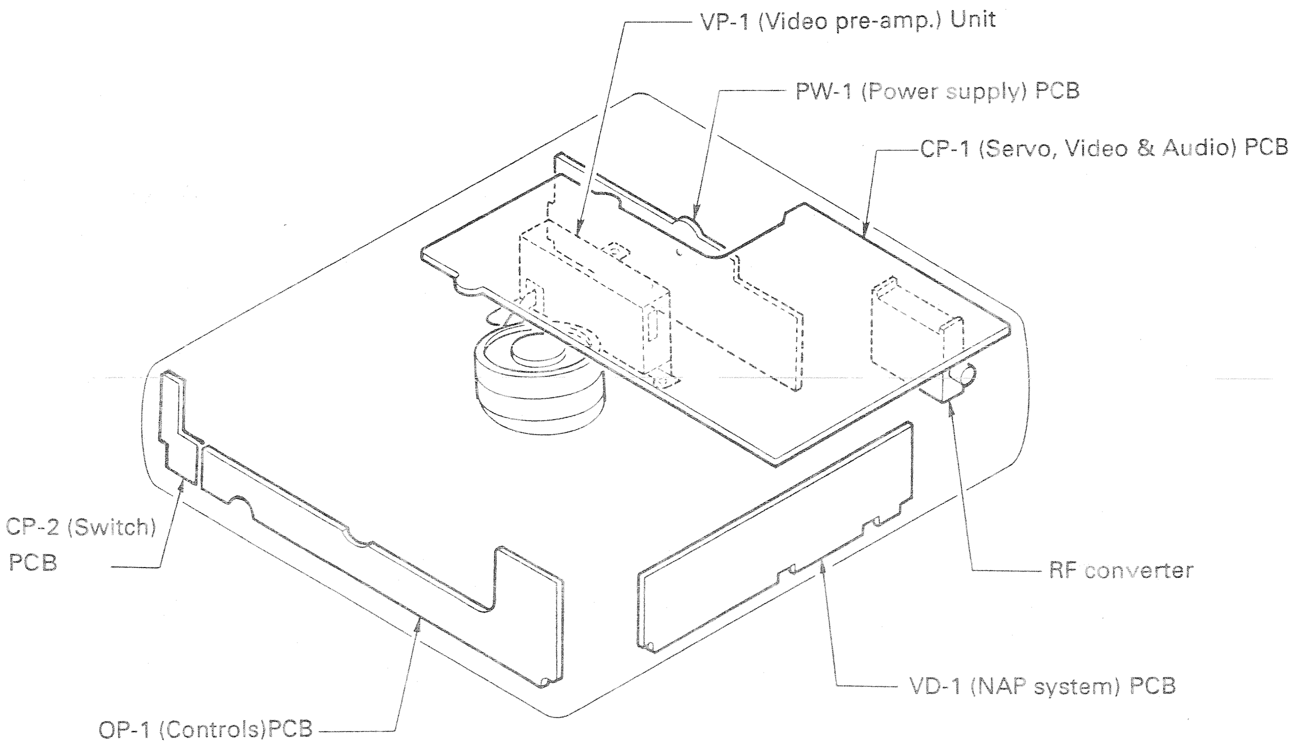

Screws +BVTP 3x10
Claws

Fig. 2-5

SECTION 3

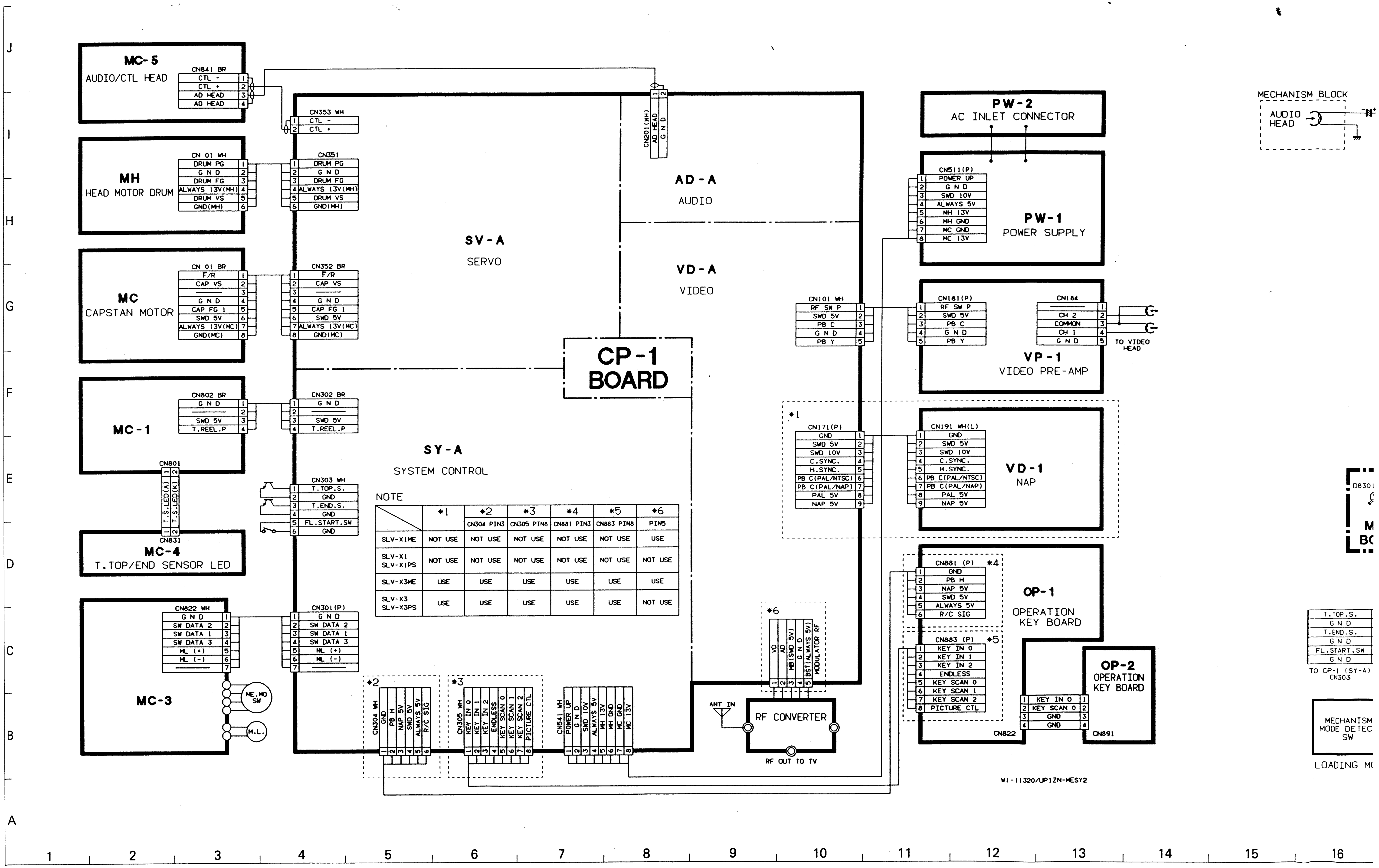
DIAGRAMS

CIRCUIT BOARD LOCATION


VP-1 (Video pre-amp.) Unit
PW-1 (Power supply) PCB
CP-1 (Servo, Video & Audio) PCB
CP-2 (Switch) PCB
RF converter
VD-1 (NAP system) PCB
OP-1 (Controls)PCB

* VD-1 (NAP system) PCB is installed on Model SLV-X3ME, SLV-X3PS and SLV-X3.

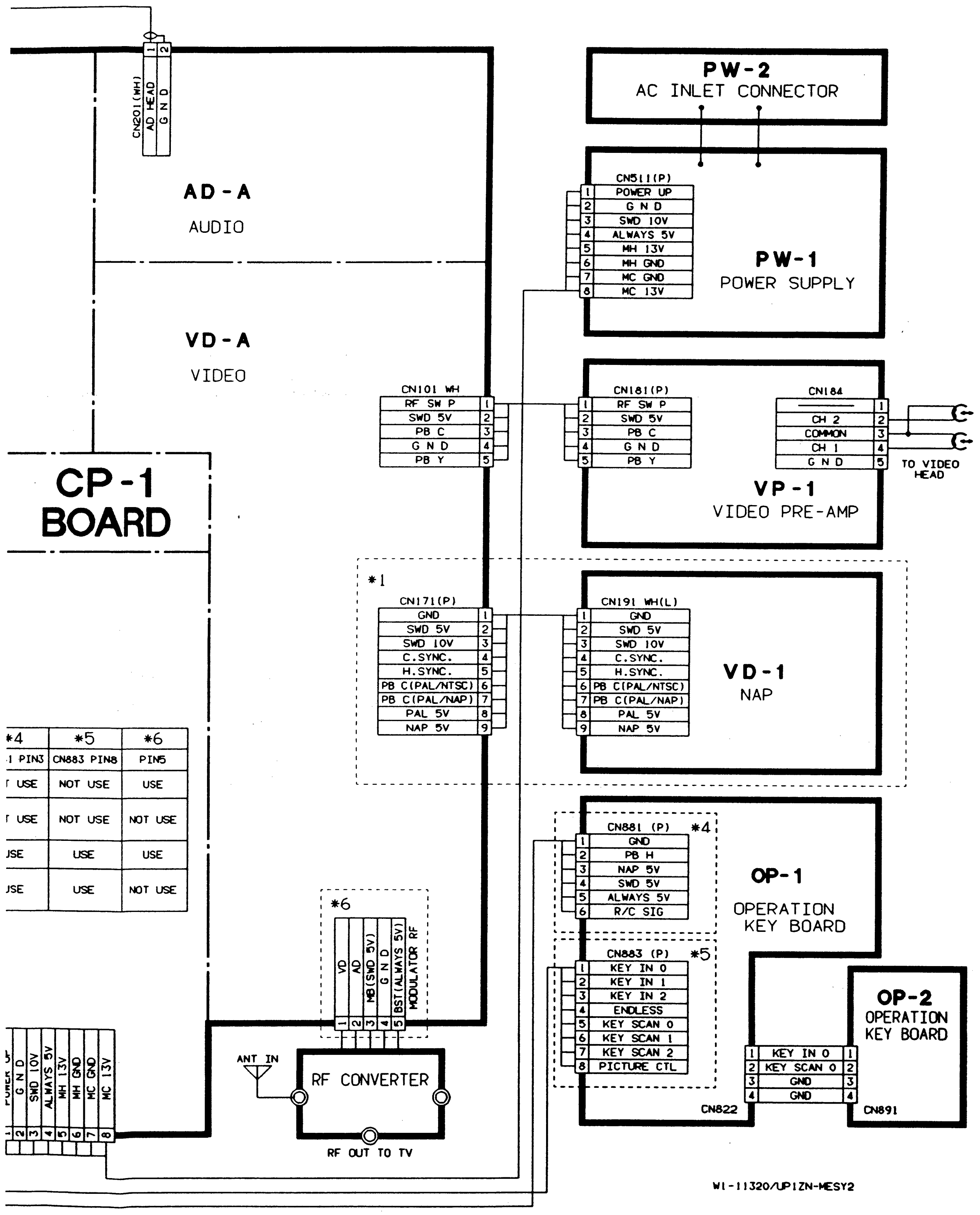
OVERALL WIRING DIAGRAM


MC-5
AUDIO/CTL HEAD
CN841 BR
CTL -
CTL +
AD HEAD
AD HEAD
CN353 WH
MH
HEAD MOTOR DRUM
CN 01 WH
DRUM PG
G N D
DRUM FG
ALWAYS 13V(MH)
DRUM VS
GND(MH)
CN351
MC
CAPSTAN MOTOR
CN 01 BR
F/R
CAP VS
CAP FG 1
SWD 5V
ALWAYS 13V(MC)
GND(MC)
CN352 BR
MC-1
CN802 BR
T.REEL.P
CN302 BR
CN801
T.S.LED(A)
T.S.LED(K)
CN831
MC-4
T.TOP/END SENSOR LED
CN303 WH
T.TOP.S.
GND
T.END.S.
FL.START.SW
MC-3
CN822 WH
SW DATA 2
SW DATA 1
SW DATA 3
ML (+)
ML (-)
ME.MO SW
M.L.
CN301(P)
SV-A
SERVO
CN201(WH)
AD HEAD
AD-A
AUDIO
VD-A
VIDEO
CP-1
BOARD
SY-A
SYSTEM CONTROL
CN304 WH
PB H
NAP 5V
ALWAYS 5V
R/C SIG
CN305 WH
KEY IN 0
KEY IN 1
KEY IN 2
ENDLESS
KEY SCAN 0
KEY SCAN 1
KEY SCAN 2
PICTURE CTL
CN541 WH
POWER UP
SWD 10V
ALWAYS 5V
MH 13V
MH GND
MC GND
MC 13V
*1
*2
*3
*4
*5
*6
VD
AD
MB(SWD 5V)
BST(ALWAYS 5V)
MODULATOR RF
ANT IN
RF CONVERTER
RF OUT TO TV
CN101 WH
RF SW P
PB C
PB Y
CN171(P)
C.SYNC.
H.SYNC.
PB C(PAL/NTSC)
PB C(PAL/NAP)
PAL 5V
NAP 5V
PW-2
AC INLET CONNECTOR
CN511(P)
PW-1
POWER SUPPLY
CN181(P)
CN184
CH 2
COMMON
CH 1
VP-1
VIDEO PRE-AMP
TO VIDEO HEAD
CN191 WH(L)
VD-1
NAP
CN881 (P)
OP-1
OPERATION KEY BOARD
CN883 (P)
OP-2
OPERATION KEY BOARD
CN822
CN891
WI-11320/UP1ZN-MESY2
MECHANISM BLOCK
AUDIO HEAD
D8301
TO CP-1 (SY-A) CN303
MECHANISM MODE DETEC SW
LOADING M
J
I
H
G
F
E
D
C
B
A
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16

NOTE

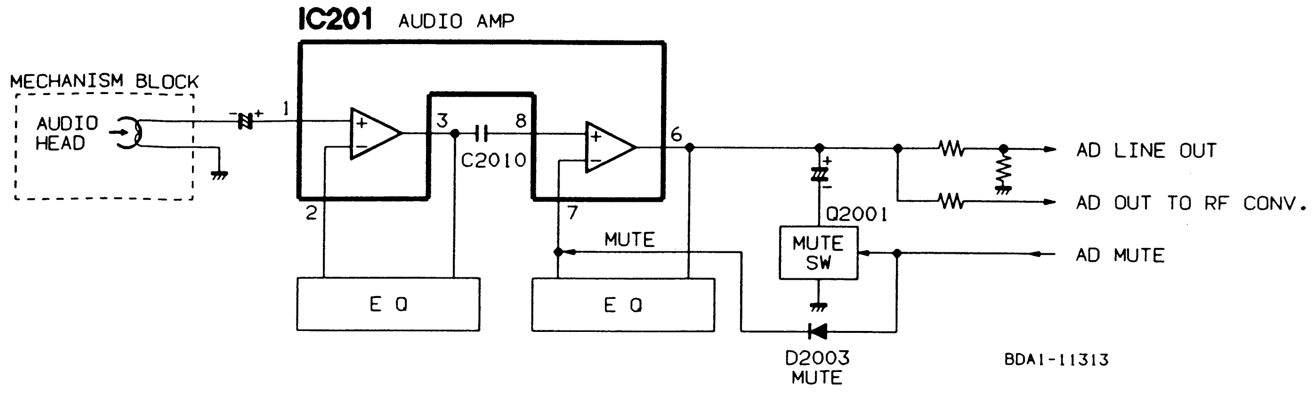
	*1	*2	*3	*4	*5	*6
		CN304 PIN3	CN305 PIN8	CN881 PIN3	CN883 PIN8	PIN5
SLV-X1ME	NOT USE	NOT USE	NOT USE	NOT USE	NOT USE	USE
SLV-X1 SLV-X1PS	NOT USE	NOT USE	NOT USE	NOT USE	NOT USE	NOT USE
SLV-X3ME	USE	USE	USE	USE	USE	USE
SLV-X3 SLV-X3PS	USE	USE	USE	USE	USE	NOT USE

LL WIRING DIAGRAM

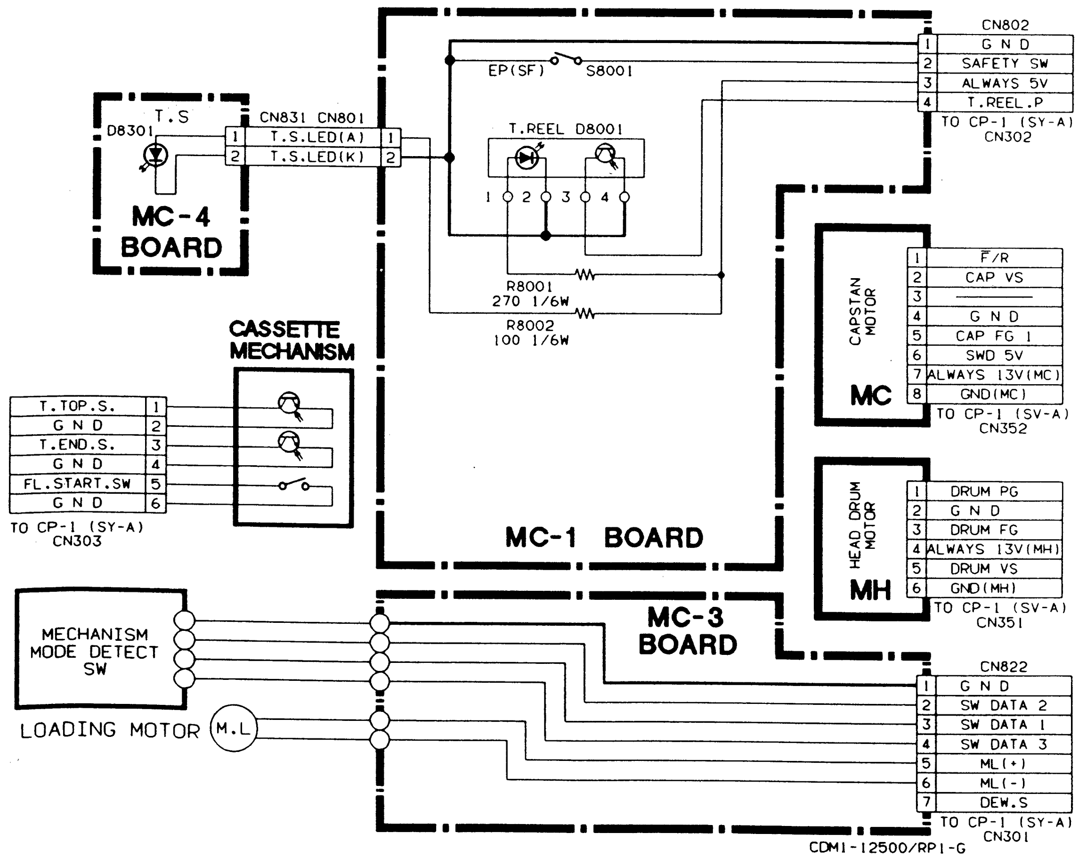

CN201(MH)
1 AD HEAD
2 G N D
AD-A
AUDIO
VD-A
VIDEO
CP-1
BOARD
PW-2
AC INLET CONNECTOR
CN511(P)
1 POWER UP
2 G N D
3 SWD 10V
4 ALWAYS 5V
5 MH 13V
6 MH GND
7 MC GND
8 MC 13V
PW-1
POWER SUPPLY
CN101 WH
1 RF SW P
2 SWD 5V
3 PB C
4 G N D
5 PB Y
CN181(P)
1 RF SW P
2 SWD 5V
3 PB C
4 G N D
5 PB Y
CN184
1
2 CH 2
3 COMMON
4 CH 1
5 G N D
TO VIDEO HEAD
VP-1
VIDEO PRE-AMP
*1
CN171(P)
1 GND
2 SWD 5V
3 SWD 10V
4 C.SYNC.
5 H.SYNC.
6 PB C(PAL/NTSC)
7 PB C(PAL/NAP)
8 PAL 5V
9 NAP 5V
CN191 WH(L)
1 GND
2 SWD 5V
3 SWD 10V
4 C.SYNC.
5 H.SYNC.
6 PB C(PAL/NTSC)
7 PB C(PAL/NAP)
8 PAL 5V
9 NAP 5V
VD-1
NAP
CN881 (P) *4
1 GND
2 PB H
3 NAP 5V
4 SWD 5V
5 ALWAYS 5V
6 R/C SIG
OP-1
OPERATION KEY BOARD
CN883 (P) *5
1 KEY IN 0
2 KEY IN 1
3 KEY IN 2
4 ENDLESS
5 KEY SCAN 0
6 KEY SCAN 1
7 KEY SCAN 2
8 PICTURE CTL
CN822
1 KEY IN 0
2 KEY SCAN 0
3 GND
4 GND
OP-2
OPERATION KEY BOARD
CN891
*6
1 VD
2 AD
3 MB(SWD 5V)
4 G N D
5 BST(ALWAYS 5V)
MODULATOR RF
ANT IN
RF CONVERTER
RF OUT TO TV
G N D
SWD 10V
ALWAYS 5V
MH 13V
MH GND
MC GND
MC 13V
WI-11320/UPIZN-MESY2

*4	*5	*6
1 PIN3	CN883 PIN8	PIN5
T USE	NOT USE	USE
T USE	NOT USE	NOT USE
USE	USE	USE
USE	USE	NOT USE

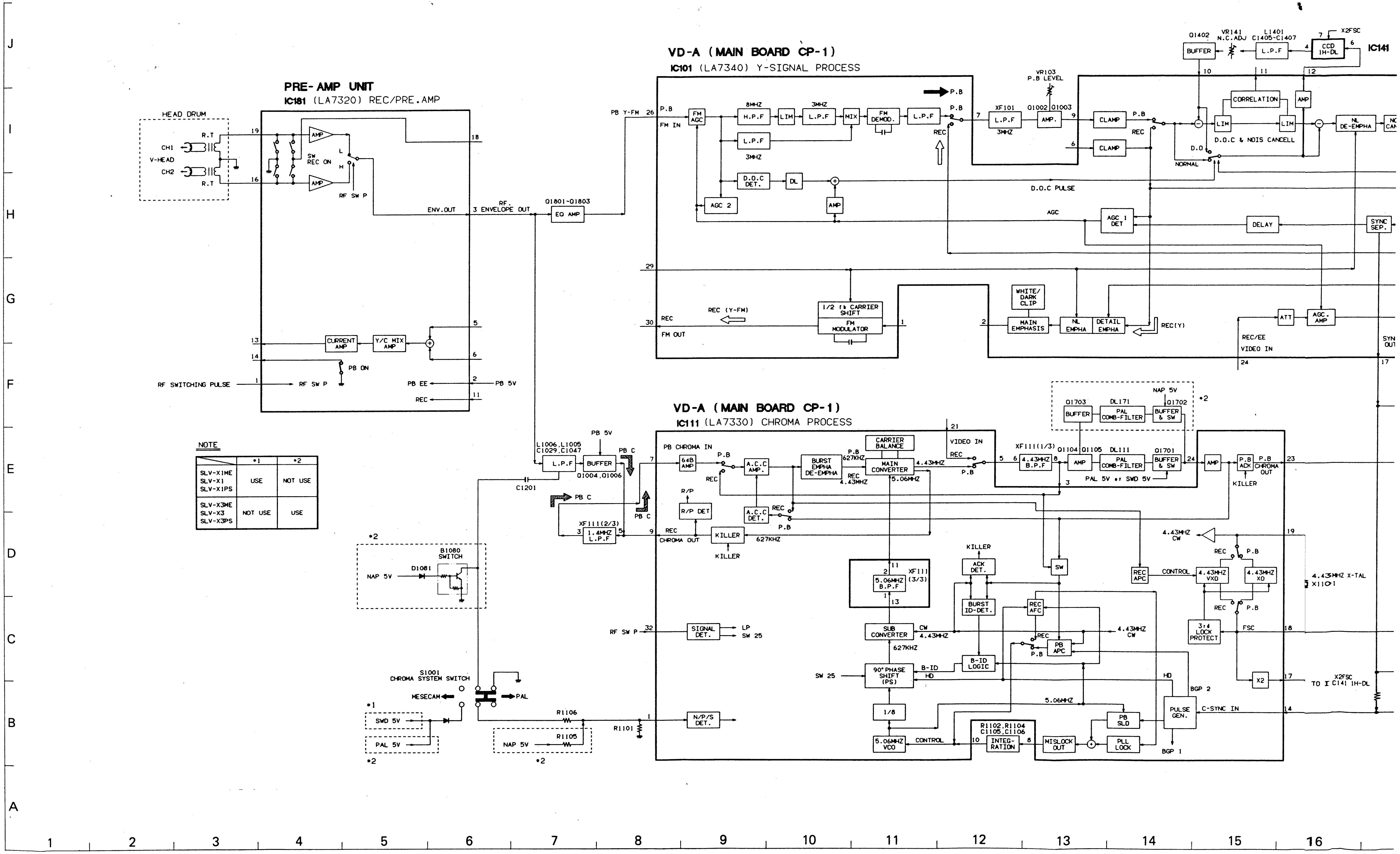
AUDIO CIRCUIT BASIC BLOCK DIAGRAM


IC201 AUDIO AMP
MECHANISM BLOCK
AUDIO HEAD
1
2
3
8
C2010
7
6
E Q
E Q
MUTE
Q2001
MUTE SW
D2003
MUTE
AD LINE OUT
AD OUT TO RF CONV.
AD MUTE
BDAI-11313

MECHANISM CONNECTION CIRCUIT DIAGRAM


T.S
D8301
MC-4
BOARD
CN831 CN801
1 T.S.LED(A)
2 T.S.LED(K)
EP(SF)
S8001
T.REEL D8001
1 2 3 4
R8001
270 1/6W
R8002
100 1/6W
CN802
1 G N D
2 SAFETY SW
3 ALWAYS 5V
4 T.REEL.P
TO CP-1 (SY-A)
CN302
CASSETTE MECHANISM
1 T.TOP.S.
2 G N D
3 T.END.S.
4 G N D
5 FL.START.SW
6 G N D
TO CP-1 (SY-A)
CN303
MC-1 BOARD
CAPSTAN MOTOR
MC
1 F/R
2 CAP VS
3
4 G N D
5 CAP FG 1
6 SWD 5V
7 ALWAYS 13V(MC)
8 GND(MC)
TO CP-1 (SV-A)
CN352
HEAD DRUM MOTOR
MH
1 DRUM PG
2 G N D
3 DRUM FG
4 ALWAYS 13V(MH)
5 DRUM VS
6 GND(MH)
TO CP-1 (SV-A)
CN351
MECHANISM MODE DETECT SW
LOADING MOTOR
M.L
MC-3
BOARD
CN822
1 G N D
2 SW DATA 2
3 SW DATA 1
4 SW DATA 3
5 ML(+)
6 ML(-)
7 DEW.S
TO CP-1 (SY-A)
CN301
CDMI-12500/RPI-G

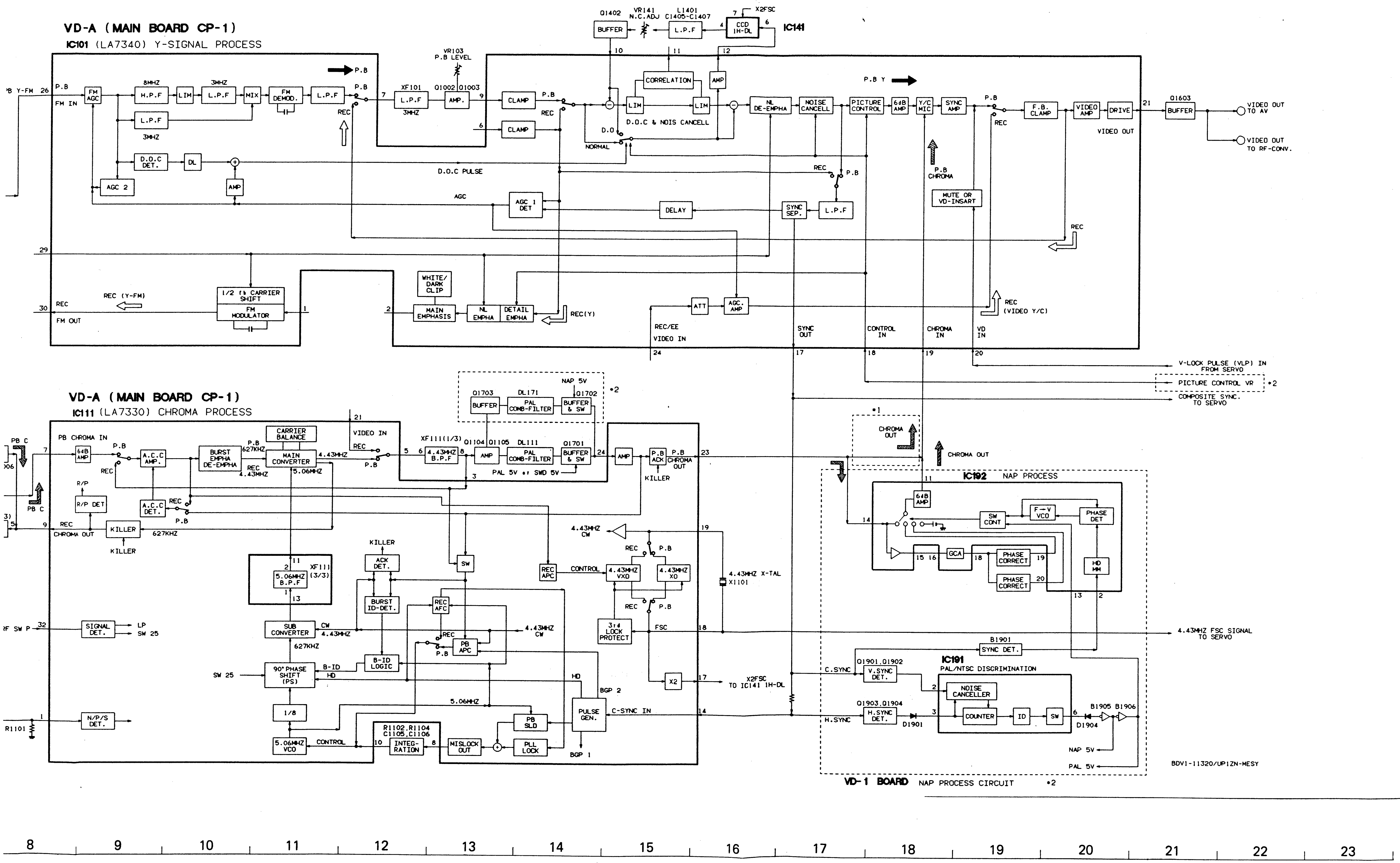
VIDEO CIRCUIT BASIC BLOCK DIAGRAM


J
I
H
G
F
E
D
C
B
A
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
PRE-AMP UNIT
IC181 (LA7320) REC/PRE.AMP
HEAD DRUM
CH1
V-HEAD
CH2
R.T
AMP
SW
REC ON
L
H
RF SW P
ENV.OUT
RF.
3 ENVELOPE OUT
CURRENT AMP
Y/C MIX AMP
PB ON
RF SWITCHING PULSE
RF SW P
PB EE
PB 5V
REC
Q1801-Q1803
EQ AMP
PB Y-FM
VD-A (MAIN BOARD CP-1)
IC101 (LA7340) Y-SIGNAL PROCESS
P.B
FM IN
FM AGC
8MHZ
H.P.F
LIM
3MHZ
L.P.F
MIX
FM DEMOD.
D.O.C DET.
DL
AGC 2
AMP
REC (Y-FM)
1/2 fH CARRIER SHIFT
FM MODULATOR
FM OUT
XF101
3MHZ
VR103
P.B LEVEL
Q1002 Q1003
CLAMP
D.O.C PULSE
AGC
AGC 1 DET
WHITE/ DARK CLIP
MAIN EMPHASIS
NL EMPHA
DETAIL EMPHA
REC(Y)
Q1402
BUFFER
VR141
N.C.ADJ
L1401
C1405-C1407
CCD 1H-DL
X2FSC
IC141
CORRELATION
D.O.C & NOIS CANCELL
D.O
NORMAL
NL DE-EMPHA
DELAY
SYNC SEP.
ATT
AGC. AMP
REC/EE
VIDEO IN
VD-A (MAIN BOARD CP-1)
IC111 (LA7330) CHROMA PROCESS
L1006, L1005
C1029, C1047
L.P.F
BUFFER
Q1004, Q1006
PB C
C1201
XF111(2/3)
1.4MHZ L.P.F
PB CHROMA IN
6dB AMP
A.C.C AMP.
A.C.C DET.
R/P
R/P DET
KILLER
CHROMA OUT
627KHZ
BURST EMPHA DE-EMPHA
627KHZ
4.43MHZ
CARRIER BALANCE
MAIN CONVERTER
5.06MHZ
XF111(1/3)
4.43MHZ B.P.F
Q1104 Q1105 DL111
PAL COMB-FILTER
Q1701
BUFFER & SW
PAL 5V *1 SWD 5V
NAP 5V
Q1703
DL171
Q1702
P.B ACK
P.B CHROMA OUT
4.43MHZ CW
REC APC
CONTROL
4.43MHZ VXO
4.43MHZ XO
4.43MHZ X-TAL X1101
3:4 LOCK PROTECT
FSC
X2
X2FSC TO IC141 1H-DL
C-SYNC IN
XF111 (3/3)
5.06MHZ B.P.F
ACK DET.
BURST ID-DET.
REC AFC
PB APC
SUB CONVERTER
CW
B-ID LOGIC
90° PHASE SHIFT (PS)
B-ID
HD
1/8
5.06MHZ VCO
R1102, R1104
C1105, C1106
INTEG-RATION
MISLOCK OUT
PB SLD
PLL LOCK
PULSE GEN.
BGP 1
BGP 2
SIGNAL DET.
LP
SW 25
N/P/S DET.
R1101
R1106
R1105
B1080 SWITCH
D1081
S1001
CHROMA SYSTEM SWITCH
MESECAM
PAL
SWD 5V
PAL 5V
*1
*2

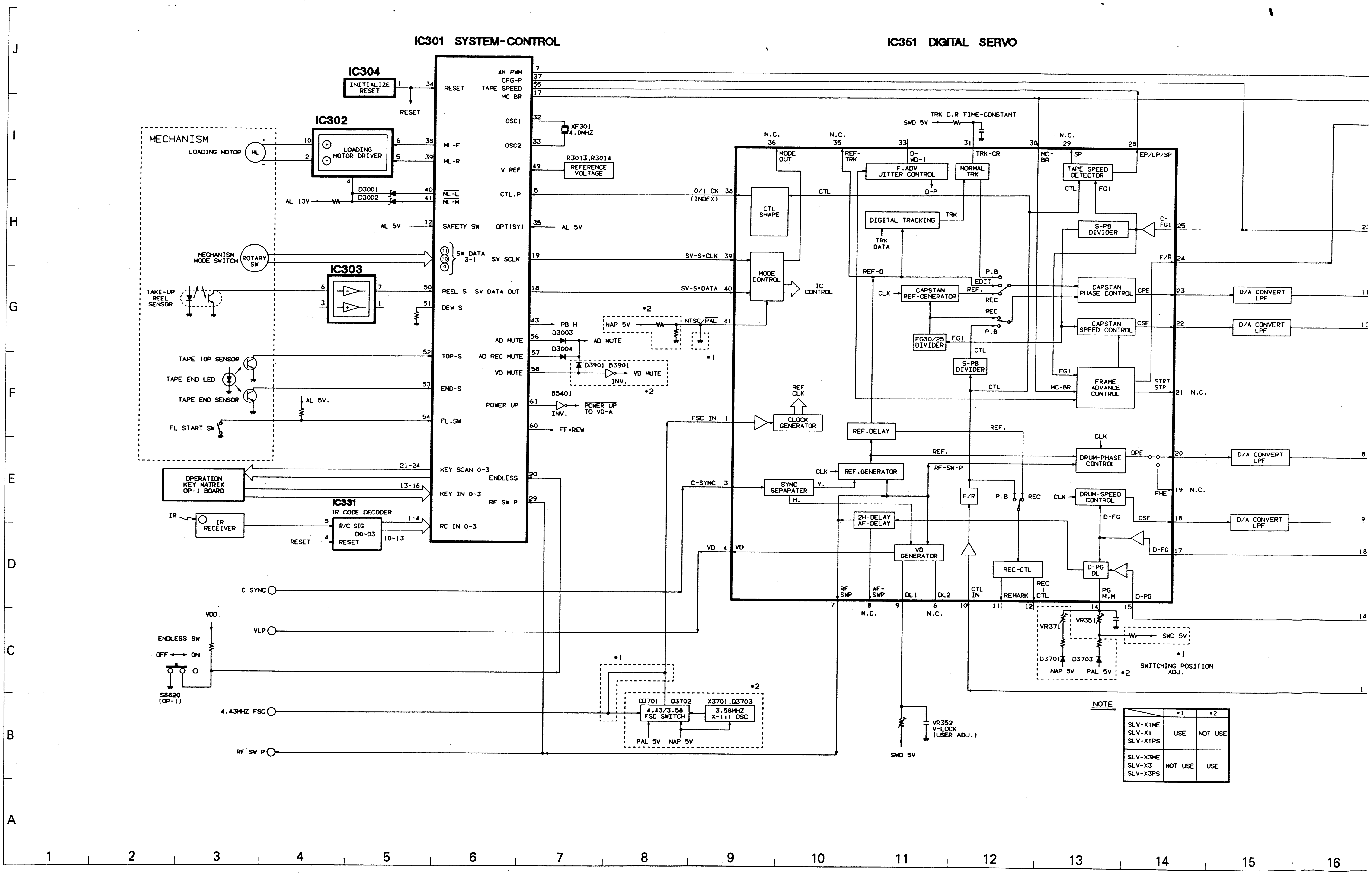
NOTE

	*1	*2
SLV-X1ME SLV-X1 SLV-X1PS	USE	NOT USE
SLV-X3ME SLV-X3 SLV-X3PS	NOT USE	USE

VIDEO CIRCUIT BASIC BLOCK DIAGRAM


VD-A (MAIN BOARD CP-1)
IC101 (LA7340) Y-SIGNAL PROCESS
P.B Y-FM 26
P.B
FM IN
FM AGC
8MHZ
H.P.F
LIM
3MHZ
L.P.F
MIX
FM DEMOD.
L.P.F
3MHZ
D.O.C DET.
DL
AMP
AGC 2
P.B
REC
XF101
L.P.F
3MHZ
VR103
P.B LEVEL
Q1002 Q1003
AMP.
7
9
6
CLAMP
CLAMP
P.B
REC
Q1402
BUFFER
VR141
N.C.ADJ
L1401
C1405~C1407
L.P.F
CCD 1H-DL
X2FSC
IC141
10
11
12
CORRELATION
AMP
LIM
LIM
D.O.C & NOIS CANCELL
D.O
NORMAL
D.O.C PULSE
AGC
AGC 1 DET
DELAY
SYNC SEP.
L.P.F
REC
P.B
P.B Y
NL DE-EMPHA
NOISE CANCELL
PICTURE CONTROL
6dB AMP
Y/C MIC
SYNC AMP
P.B
REC
F.B. CLAMP
VIDEO AMP
DRIVE
VIDEO OUT
21
Q1603
BUFFER
VIDEO OUT TO AV
VIDEO OUT TO RF-CONV.
P.B CHROMA
MUTE OR VD-INSART
REC
29
30
REC
FM OUT
REC (Y-FM)
1/2 fH CARRIER SHIFT
FM MODULATOR
1
2
WHITE/ DARK CLIP
MAIN EMPHASIS
NL EMPHA
DETAIL EMPHA
REC(Y)
ATT
AGC. AMP
REC (VIDEO Y/C)
REC/EE VIDEO IN
24
SYNC OUT
17
CONTROL IN
18
CHROMA IN
19
VD IN
20
V-LOCK PULSE (VLP) IN FROM SERVO
PICTURE CONTROL VR *2
COMPOSITE SYNC. TO SERVO
VD-A (MAIN BOARD CP-1)
IC111 (LA7330) CHROMA PROCESS
NAP 5V
Q1703
BUFFER
DL171
PAL COMB-FILTER
Q1702
BUFFER & SW
*2
PB C
PB CHROMA IN
7
6dB AMP
P.B
REC
A.C.C AMP.
BURST EMPHA DE-EMPHA
P.B 627KHZ
REC 4.43MHZ
CARRIER BALANCE
MAIN CONVERTER
4.43MHZ
5.06MHZ
21
VIDEO IN
REC
P.B
5
6
XF111(1/3)
4.43MHZ B.P.F
8
Q1104 Q1105
AMP
DL111
PAL COMB-FILTER
Q1701
BUFFER & SW
24
PAL 5V or SWD 5V
3
AMP
P.B ACK
P.B CHROMA OUT
23
KILLER
R/P
R/P DET
A.C.C DET.
REC
P.B
PB C
9
REC
CHROMA OUT
KILLER
627KHZ
KILLER
11
2
5.06MHZ B.P.F
XF111 (3/3)
1
13
ACK DET.
KILLER
SW
BURST ID-DET.
REC AFC
REC APC
CONTROL
4.43MHZ CW
REC
P.B
4.43MHZ VXO
4.43MHZ XO
19
4.43MHZ X-TAL
X1101
REC
P.B
3/4 LOCK PROTECT
FSC
18
SF SW P 32
SIGNAL DET.
LP
SW 25
SUB CONVERTER
CW
4.43MHZ
627KHZ
4.43MHZ CW
REC
P.B
PB APC
SW 25
90° PHASE SHIFT (PS)
B-ID
HD
B-ID LOGIC
HD
BGP 2
X2
17
X2FSC TO IC141 1H-DL
1/8
5.06MHZ
PULSE GEN.
C-SYNC IN
14
R1101
1
N/P/S DET.
5.06MHZ VCO
CONTROL
R1102,R1104 C1105,C1106
10
INTEG-RATION
8
MISLOCK OUT
PB SLD
PLL LOCK
BGP 1
*1
CHROMA OUT
CHROMA OUT
11
IC192 NAP PROCESS
6dB AMP
14
SW CONT
F→V VCO
PHASE DET
15 16
GCA
18
PHASE CORRECT
19
PHASE CORRECT
20
HD MM
13
2
4.43MHZ FSC SIGNAL TO SERVO
B1901
SYNC DET.
Q1901,Q1902
C.SYNC
V.SYNC DET.
IC191
PAL/NTSC DISCRIMINATION
2
NOISE CANCELLER
Q1903,Q1904
H.SYNC
H.SYNC DET.
D1901
3
COUNTER
ID
SW
6
B1905 B1906
D1904
NAP 5V
PAL 5V
BDV1-11320/UP1ZN-MESY
VD-1 BOARD NAP PROCESS CIRCUIT *2
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23

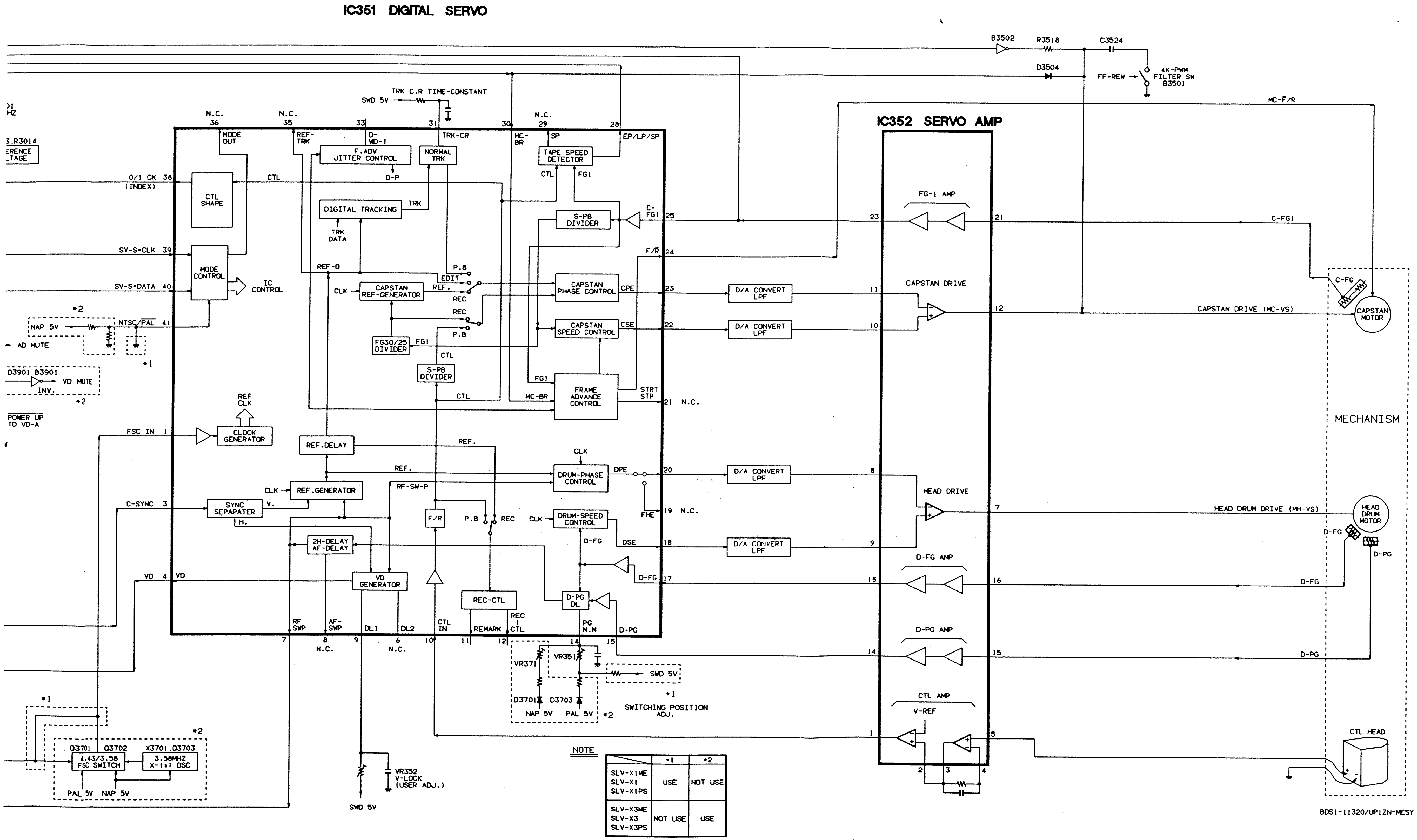
SYSTEM CONTROL & SERVO CIRCUIT BASIC BLOCK DIAGRAM


IC301 SYSTEM-CONTROL
IC351 DIGITAL SERVO
IC304
INITIALIZE RESET
RESET
IC302
LOADING MOTOR DRIVER
MECHANISM
LOADING MOTOR
ML
AL 13V
D3001
D3002
AL 5V
MECHANISM MODE SWITCH
ROTARY SW
IC303
TAKE-UP REEL SENSOR
TAPE TOP SENSOR
TAPE END LED
TAPE END SENSOR
AL 5V.
FL START SW
OPERATION KEY MATRIX OP-1 BOARD
IR
IR RECEIVER
IC331
IR CODE DECODER
R/C SIG
D0-D3
RESET
RC IN 0-3
KEY SCAN 0-3
KEY IN 0-3
ENDLESS
RF SW P
FL.SW
END-S
TOP-S
DEW S
REEL S
SV DATA OUT
SW DATA 3-1
SV SCLK
SAFETY SW
OPT(SY)
ML-F
ML-R
OSC1
OSC2
V REF
CTL.P
4K PWM
CFG-P
TAPE SPEED
MC BR
XF301 4.0MHZ
R3013,R3014
REFERENCE VOLTAGE
PB H
D3003
AD MUTE
D3004
AD REC MUTE
D3901 B3901
VD MUTE
INV.
POWER UP
B5401
POWER UP TO VD-A
FF+REW
NAP 5V
NTSC/PAL
*1
*2
0/1 CK (INDEX)
SV-S•CLK
SV-S•DATA
FSC IN
C-SYNC
VD
CTL SHAPE
MODE CONTROL
IC CONTROL
REF CLK
CLOCK GENERATOR
SYNC SEPAPATER
REF.DELAY
REF.GENERATOR
2H-DELAY AF-DELAY
VD GENERATOR
MODE OUT
REF-TRK
D-WD-1
F.ADV JITTER CONTROL
TRK-CR
NORMAL TRK
DIGITAL TRACKING
TRK DATA
REF-D
CLK
CAPSTAN REF-GENERATOR
EDIT
P.B
REC
FG30/25 DIVIDER
FG1
S-PB DIVIDER
CTL
TRK C.R TIME-CONSTANT
SWD 5V
MC-BR
SP
TAPE SPEED DETECTOR
EP/LP/SP
C-FG1
S-PB DIVIDER
F/R
CAPSTAN PHASE CONTROL
CPE
CAPSTAN SPEED CONTROL
CSE
FRAME ADVANCE CONTROL
STRT STP
N.C.
DRUM-PHASE CONTROL
DPE
DRUM-SPEED CONTROL
FHE
D-FG
DSE
D-PG DL
REC-CTL
REMARK
REC CTL
PG M.M
D-PG
RF SWP
AF-SWP
DL1
DL2
CTL IN
RF-SW-P
D/A CONVERT LPF
VR371
VR351
D3701
D3703
NAP 5V
PAL 5V
SWITCHING POSITION ADJ.
VR352 V-LOCK (USER ADJ.)
SWD 5V
C SYNC
VLP
VDD
ENDLESS SW
OFF ON
S8820 (OP-1)
4.43MHZ FSC
RF SW P
Q3701 Q3702
4.43/3.58 FSC SWITCH
X3701,Q3703
3.58MHZ X-tal OSC
PAL 5V NAP 5V
J
I
H
G
F
E
D
C
B
A
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16

NOTE

	*1	*2
SLV-X1ME SLV-X1 SLV-X1PS	USE	NOT USE
SLV-X3ME SLV-X3 SLV-X3PS	NOT USE	USE

SYSTEM CONTROL & SERVO CIRCUIT BASIC BLOCK DIAGRAM



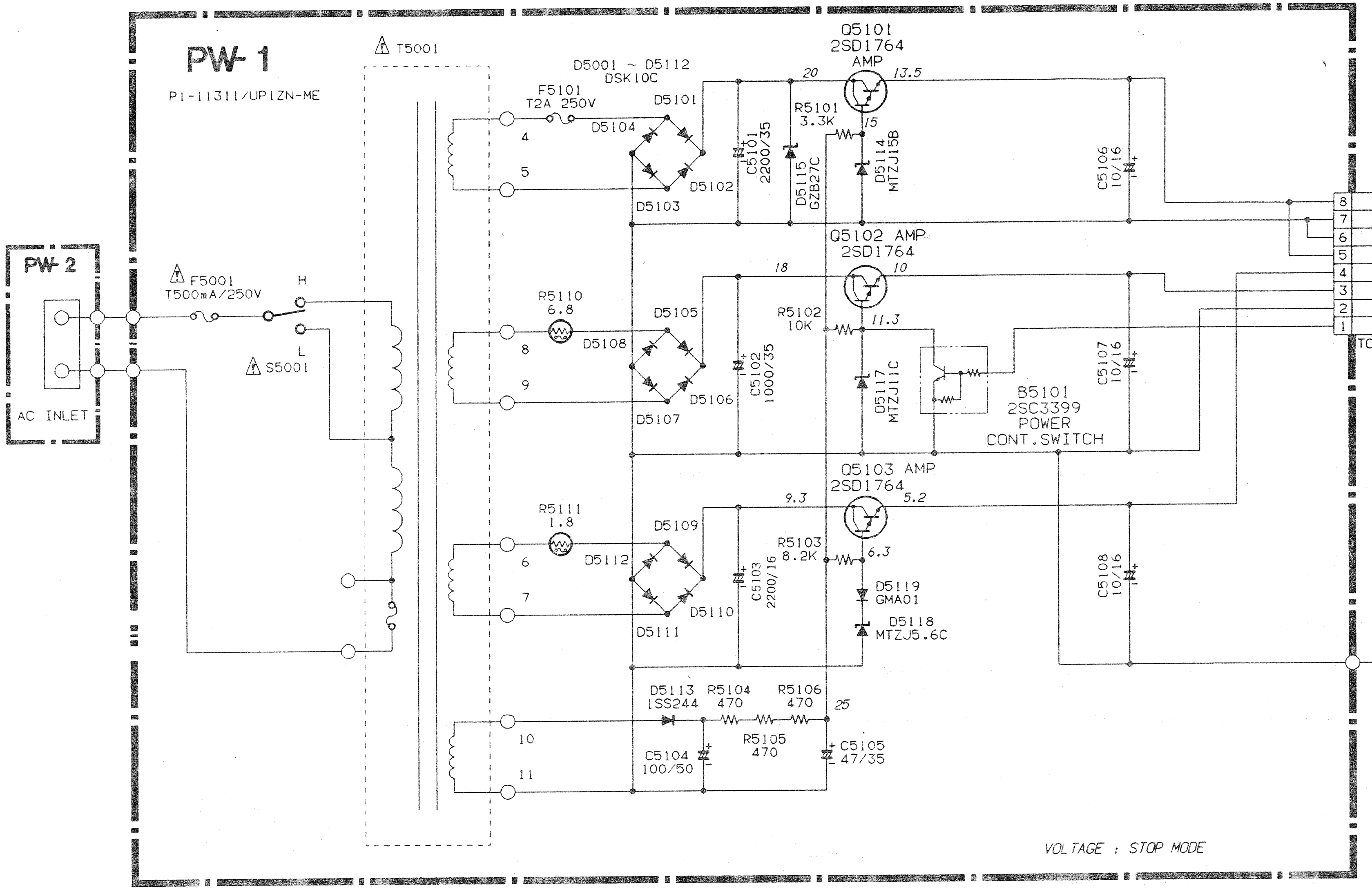
IC351 DIGITAL SERVO
IC352 SERVO AMP
)1
HZ
3.R3014
ERENCE
TAGE
0/1 CK 38
(INDEX)
SV-S•CLK 39
SV-S•DATA 40
NTSC/PAL 41
NAP 5V
AD MUTE
D3901 B3901
VD MUTE
INV.
POWER UP
TO VD-A
FSC IN 1
C-SYNC 3
VD 4
TRK C.R TIME-CONSTANT
SWD 5V
N.C. 36
N.C. 35
33
31
30
N.C. 29
28
MODE OUT
REF-TRK
D-WD-1
F.ADV JITTER CONTROL
D-P
NORMAL TRK
TRK-CR
MC-BR
SP
TAPE SPEED DETECTOR
EP/LP/SP
CTL
FG1
CTL SHAPE
DIGITAL TRACKING
TRK
TRK DATA
MODE CONTROL
IC CONTROL
REF-D
CLK
CAPSTAN REF-GENERATOR
P.B
EDIT
REF.
REC
FG30/25 DIVIDER
S-PB DIVIDER
C-FG1 25
F/R 24
CAPSTAN PHASE CONTROL
CPE 23
CAPSTAN SPEED CONTROL
CSE 22
FRAME ADVANCE CONTROL
STRT STP
21 N.C.
REF CLK
CLOCK GENERATOR
REF.DELAY
DRUM-PHASE CONTROL
DPE 20
FHE
19 N.C.
SYNC SEPAPATER
V.
H.
REF.GENERATOR
RF-SW-P
F/R
DRUM-SPEED CONTROL
DSE 18
D-FG
D-FG 17
2H-DELAY AF-DELAY
VD GENERATOR
REC-CTL
D-PG DL
RF SWP 7
AF-SWP 8 N.C.
DL1 9
DL2 6 N.C.
CTL IN 10
REMARK 11
REC CTL 12
PG M.M 14
D-PG 15
VR371
VR351
D3701
D3703
NAP 5V
PAL 5V
SWD 5V
*1
*2
SWITCHING POSITION ADJ.
VR352
V-LOCK
(USER ADJ.)
Q3701 Q3702
4.43/3.58 FSC SWITCH
X3701 Q3703
3.58MHZ X-tal OSC
PAL 5V NAP 5V
B3502
R3518
C3524
D3504
FF+REW
4K-PWM FILTER SW
B3501
MC-F/R
D/A CONVERT LPF
FG-1 AMP
23
21
C-FG1
CAPSTAN DRIVE
11
10
12
CAPSTAN DRIVE (MC-VS)
HEAD DRIVE
8
9
7
HEAD DRUM DRIVE (MH-VS)
D-FG AMP
18
16
D-FG
D-PG AMP
14
15
D-PG
CTL AMP
V-REF
1
5
2
3
4
C-FG
CAPSTAN MOTOR
MECHANISM
HEAD DRUM MOTOR
D-FG
D-PG
CTL HEAD
BDS1-11320/UP1ZN-MESY

NOTE

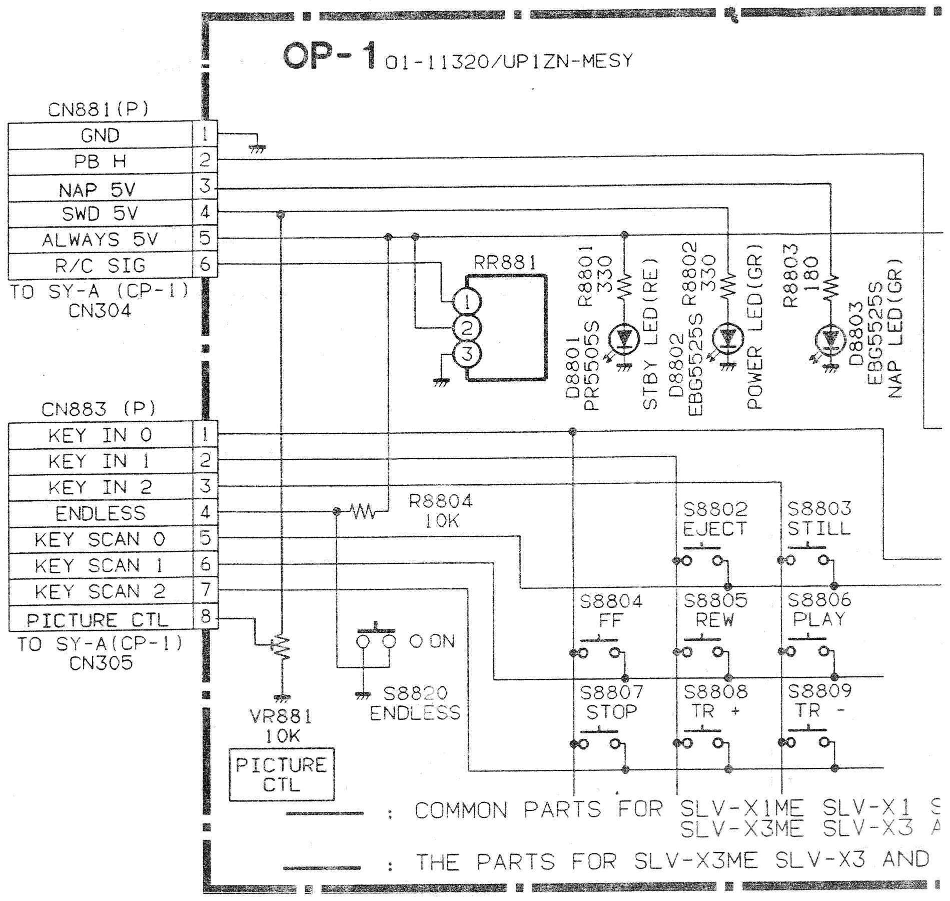
	*1	*2
SLV-X1ME SLV-X1 SLV-X1PS	USE	NOT USE
SLV-X3ME SLV-X3 SLV-X3PS	NOT USE	USE

SECTION 4 PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

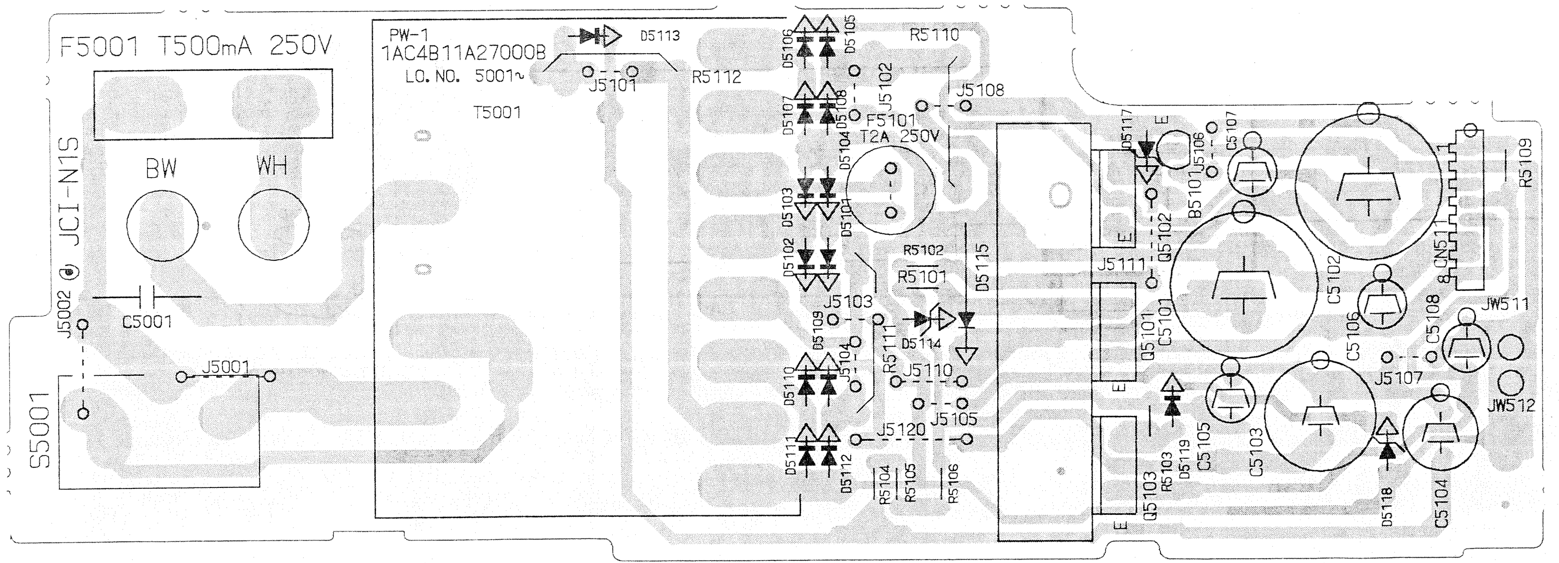
PW-1,2 BOARD POWER SUPPLY, AC INLET CONNECTOR CIRCUIT DIAGRAM


PW-1
P1-11311/UP1ZN-ME
PW-2
AC INLET
F5001 T500mA/250V
S5001
H
L
T5001
F5101 T2A 250V
D5001 ~ D5112 DSK10C
D5101
D5102
D5103
D5104
D5105
D5106
D5107
D5108
D5109
D5110
D5111
D5112
Q5101 2SD1764 AMP
Q5102 AMP 2SD1764
Q5103 AMP 2SD1764
R5101 3.3K
R5102 10K
R5103 8.2K
R5110 6.8
R5111 1.8
C5101 2200/35
C5102 1000/35
C5103 2200/16
C5106 10/16
C5107 10/16
C5108 10/16
D5114 MTZJ15B
D5115 GZB27C
D5117 MTZJ11C
D5119 GMA01
D5118 MTZJ5.6C
B5101 2SC3399 POWER CONT.SWITCH
D5113 1SS244
R5104 470
R5105 470
R5106 470
C5104 100/50
C5105 47/35
20
13.5
15
18
10
11.3
9.3
5.2
6.3
25
4
5
8
9
6
7
10
11
CN511
8 MC 13V
7 MC GND
6 MH GND
5 MH 13V
4 ALWAYS 5V
3 SWD 10V
2 GND
1 POWER UP
TO PW-A(CP-1) CN541
VOLTAGE : STOP MODE

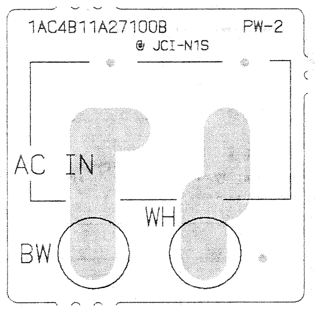
OP-1,2 BOARD OPERATIO

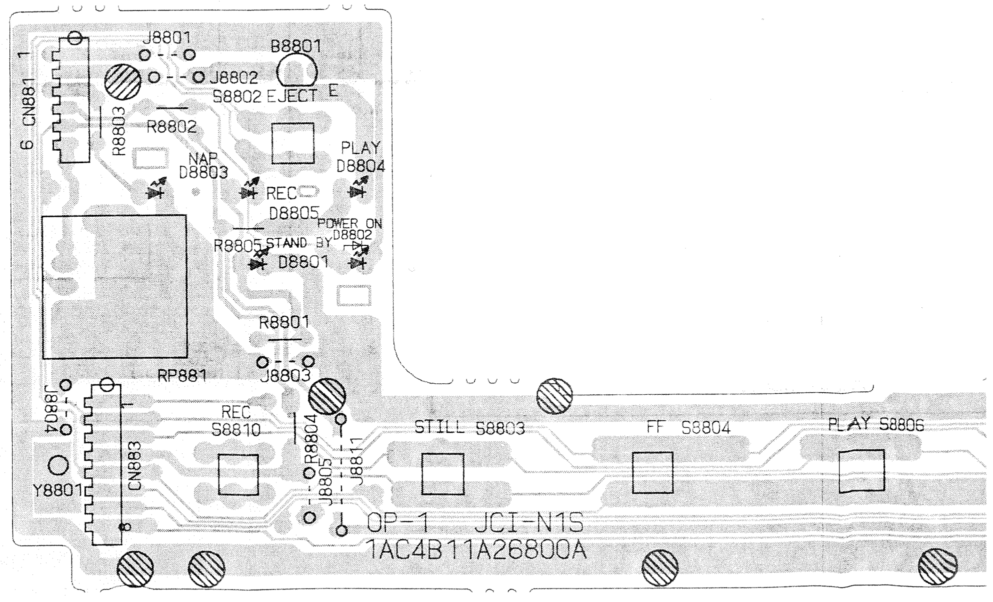

OP-1 01-11320/UP1ZN-MESY
CN881(P)
1 GND
2 PB H
3 NAP 5V
4 SWD 5V
5 ALWAYS 5V
6 R/C SIG
TO SY-A (CP-1) CN304
RR881
R8801 330
R8802 330
R8803 180
D8801 PR5505S STBY LED(RE)
D8802 EBG5525S POWER LED(GR)
D8803 EBG5525S NAP LED(GR)
CN883 (P)
1 KEY IN 0
2 KEY IN 1
3 KEY IN 2
4 ENDLESS
5 KEY SCAN 0
6 KEY SCAN 1
7 KEY SCAN 2
8 PICTURE CTL
TO SY-A(CP-1) CN305
R8804 10K
VR881 10K
PICTURE CTL
S8820 ENDLESS
O ON
S8802 EJECT
S8803 STILL
S8804 FF
S8805 REW
S8806 PLAY
S8807 STOP
S8808 TR +
S8809 TR -
: COMMON PARTS FOR SLV-X1ME SLV-X1 S SLV-X3ME SLV-X3 A
: THE PARTS FOR SLV-X3ME SLV-X3 AND

PW-1 P.C.B.

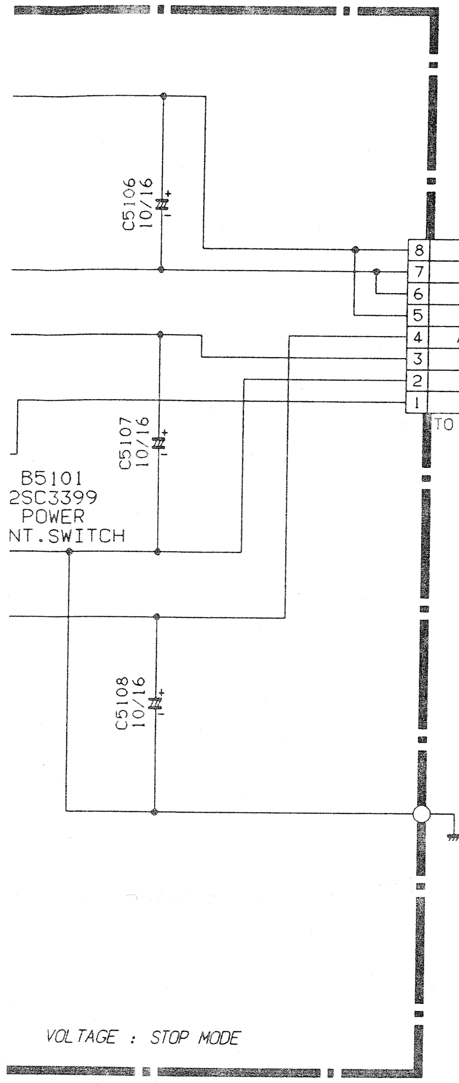

F5001 T500mA 250V
JCI-N1S
BW
WH
C5001
J5002
J5001
S5001
PW-1
1AC4B11A27000B
LO. NO. 5001
T5001
D5113
J5101
R5112
R5110
F5101 T2A 250V
J5108
J5103
R5102
R5101
D5115
J5110
J5120
J5105
R5104
R5105
R5106
D5101
D5102
D5103
D5104
D5105
D5106
D5107
D5108
D5109
D5110
D5111
D5112
D5114
D5117
Q5101
Q5102
Q5103
B5101
J5111
C5101
C5102
C5103
C5104
C5105
C5106
C5107
C5108
D5119
D5118
D5103
R5103
J5107
CN511
R5109
JW511
JW512
E

PW-2 P.C.B.


1AC4B11A27100B
PW-2
JCI-N1S
AC IN
WH
BW

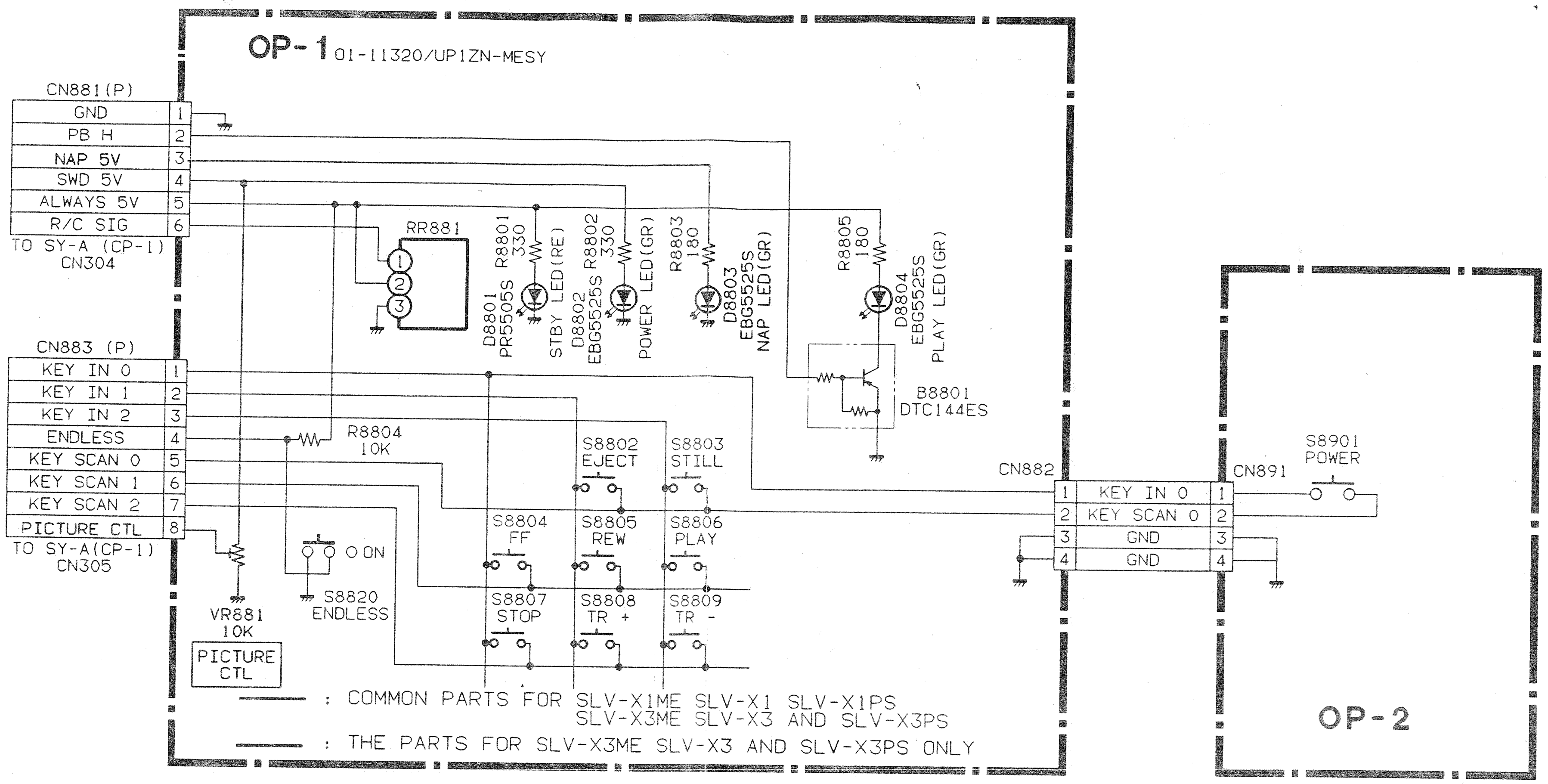

CN881
1
6
J8801
B8801
J8802
S8802 EJECT
E
R8803
R8802
NAP D8803
PLAY D8804
REC D8805
POWER ON D8802
R8805
STAND BY D8801
R8801
RP881
J8803
J8804
REC S8810
R8804
J8805
J8811
STILL S8803
FF S8804
PLAY S8806
CN883
Y8801
OP-1 JCI-N1S
1AC4B11A26800A

IAGRAMS
RCUIT DIAGRAM

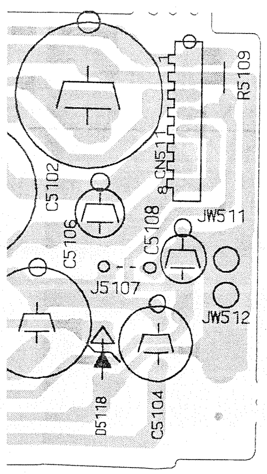


C5106 10/16
CN511
8 MC 13V
7 MC GND
6 MH GND
5 MH 13V
4 ALWAYS 5V
3 SWD 10V
2 GND
1 POWER UP
TO PW-A(CP-1) CN541
C5107 10/16
B5101
2SC3399
POWER
NT.SWITCH
C5108 10/16
VOLTAGE : STOP MODE

OP-1,2 BOARD OPERATION CIRCUIT DIAGRAM

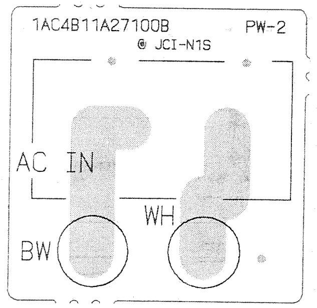


OP-1 01-11320/UP1ZN-MESY
CN881(P)
GND 1
PB H 2
NAP 5V 3
SWD 5V 4
ALWAYS 5V 5
R/C SIG 6
TO SY-A (CP-1) CN304
RR881
R8801 330
D8801 PR5505S STBY LED(RE)
R8802 330
D8802 EBG5525S POWER LED(GR)
R8803 180
D8803 EBG5525S NAP LED(GR)
R8805 180
D8804 EBG5525S PLAY LED(GR)
B8801 DTC144ES
CN883 (P)
KEY IN 0 1
KEY IN 1 2
KEY IN 2 3
ENDLESS 4
KEY SCAN 0 5
KEY SCAN 1 6
KEY SCAN 2 7
PICTURE CTL 8
TO SY-A(CP-1) CN305
R8804 10K
VR881 10K
PICTURE CTL
S8820 ENDLESS
O ON
S8802 EJECT
S8803 STILL
S8804 FF
S8805 REW
S8806 PLAY
S8807 STOP
S8808 TR +
S8809 TR -
CN882
1 KEY IN 0 1
2 KEY SCAN 0 2
3 GND 3
4 GND 4
CN891
S8901 POWER
OP-2
—— : COMMON PARTS FOR SLV-X1ME SLV-X1 SLV-X1PS SLV-X3ME SLV-X3 AND SLV-X3PS
—— : THE PARTS FOR SLV-X3ME SLV-X3 AND SLV-X3PS ONLY



R5109
C5102
CN511
C5106
C5108
JW511
J5107
JW512
D5118
C5104

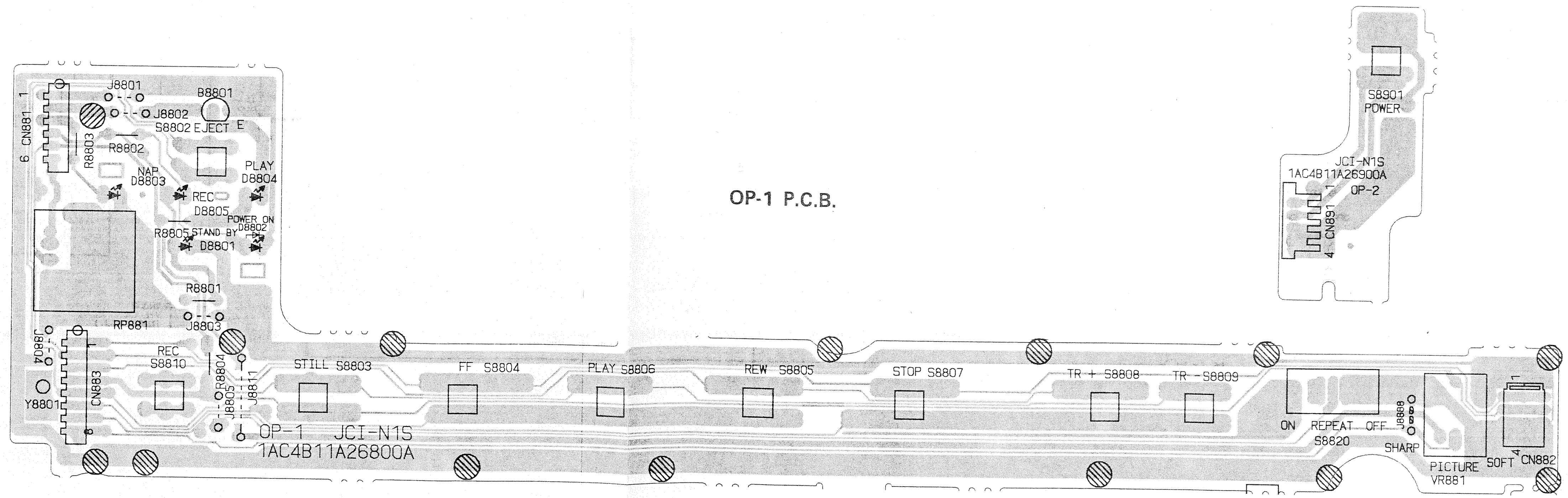
PW-2 P.C.B.



1AC4B11A27100B
PW-2
JCI-N1S
AC IN
WH
BW

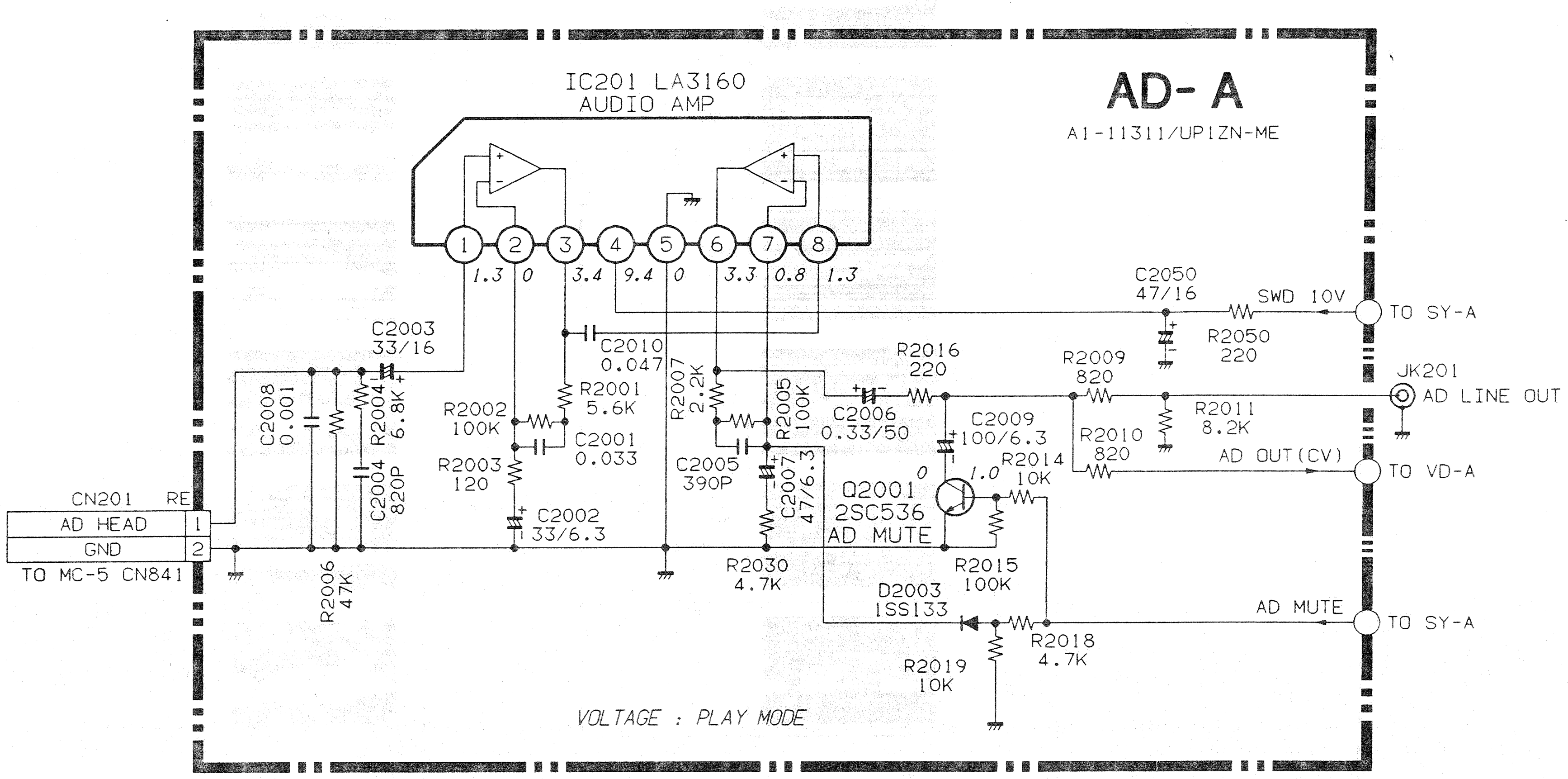
OP-2 P.C.B.

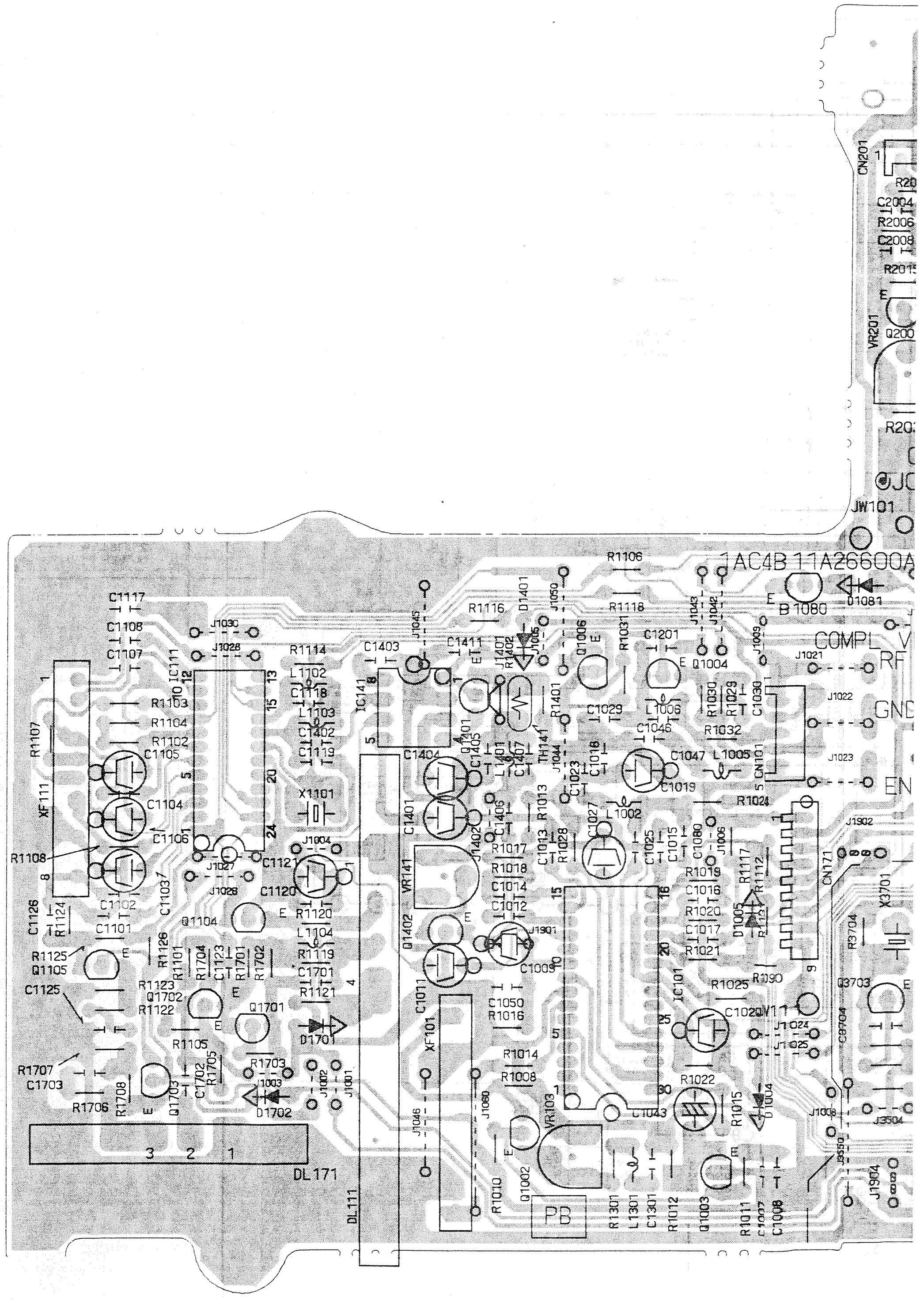
OP-1 P.C.B.

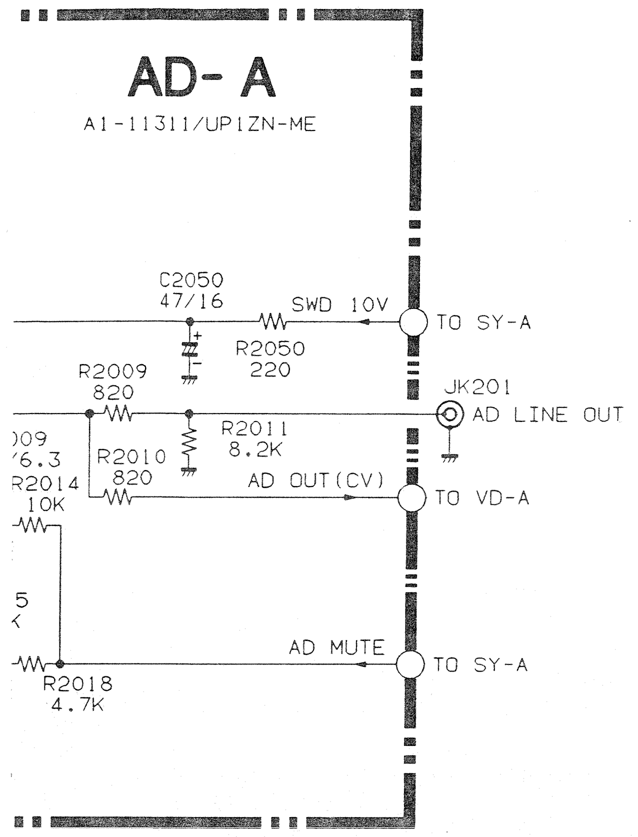


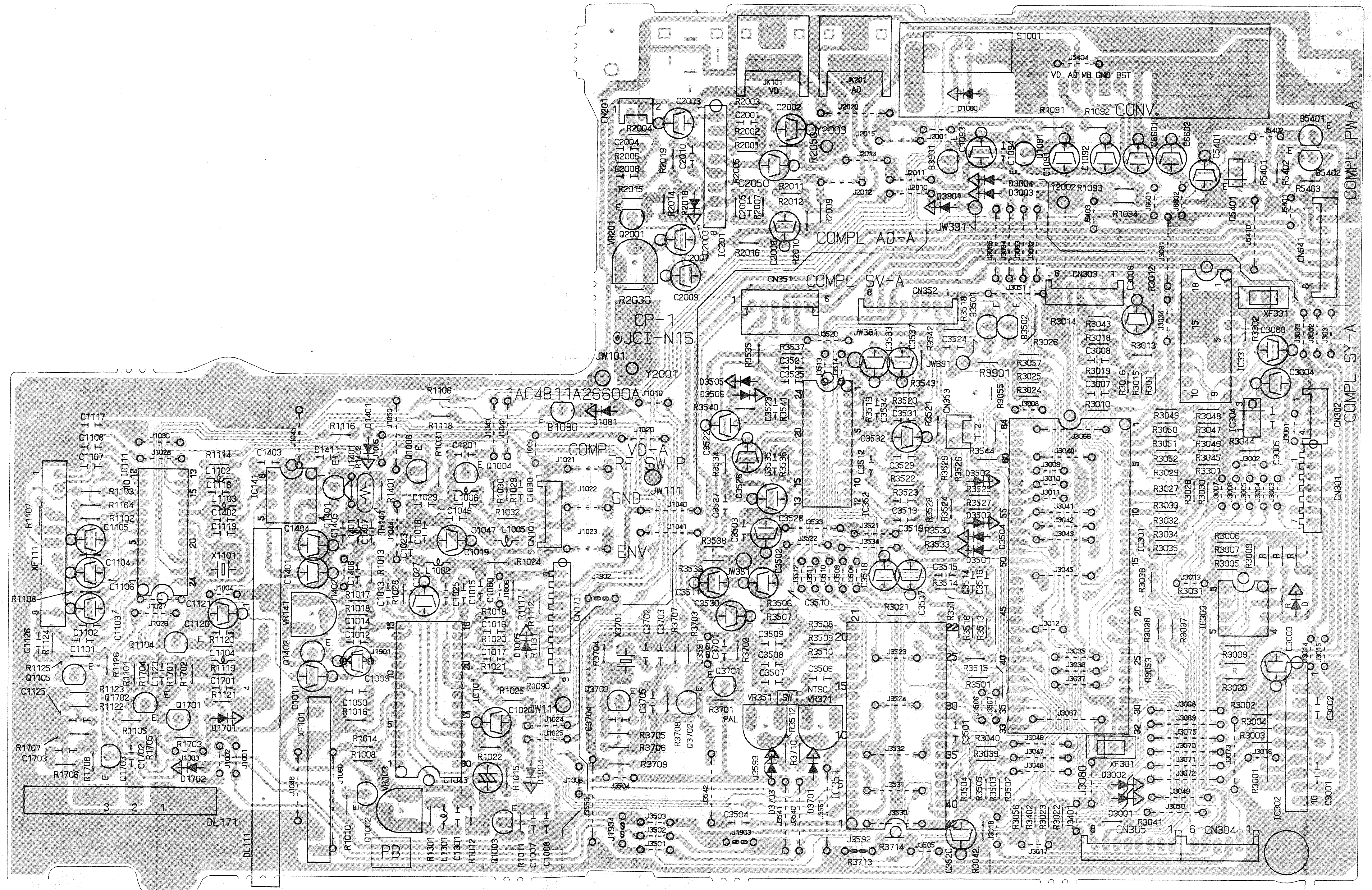
S8901 POWER
JCI-N1S
1AC4B11A26900A
OP-2
CN891
CN881
J8801
B8801
J8802
S8802 EJECT
R8803
R8802
NAP D8803
PLAY D8804
REC D8805
POWER ON D8802
R8805
STAND BY D8801
R8801
RP881
J8803
J8804
REC S8810
CN883
Y8801
R8804
J8805
J8811
OP-1 JCI-N1S
1AC4B11A26800A
STILL S8803
FF S8804
PLAY S8806
REW S8805
STOP S8807
TR + S8808
TR - S8809
ON REPEAT OFF
S8820
J8888
SHARP
PICTURE VR881
SOFT CN882

CP-1 BOARD (AD-A) AUDIO CIRCUIT DIAGARM


AD- A
A1-11311/UP1ZN-ME
IC201 LA3160
AUDIO AMP
1 2 3 4 5 6 7 8
1.3 0 3.4 9.4 0 3.3 0.8 1.3
C2050
47/16
SWD 10V
R2050
220
TO SY-A
C2003
33/16
C2010
0.047
R2016
220
R2009
820
JK201
AD LINE OUT
R2011
8.2K
C2008
0.001
R2004
6.8K
R2002
100K
R2001
5.6K
R2007
2.2K
R2005
100K
C2006
0.33/50
C2009
100/6.3
R2010
820
AD OUT(CV)
TO VD-A
C2001
0.033
R2003
120
C2004
820P
C2005
390P
C2007
47/6.3
1.0
R2014
10K
0
Q2001
2SC536
AD MUTE
CN201 RE
AD HEAD 1
GND 2
TO MC-5 CN841
C2002
33/6.3
R2006
47K
R2030
4.7K
R2015
100K
D2003
1SS133
R2018
4.7K
R2019
10K
AD MUTE
TO SY-A
VOLTAGE : PLAY MODE

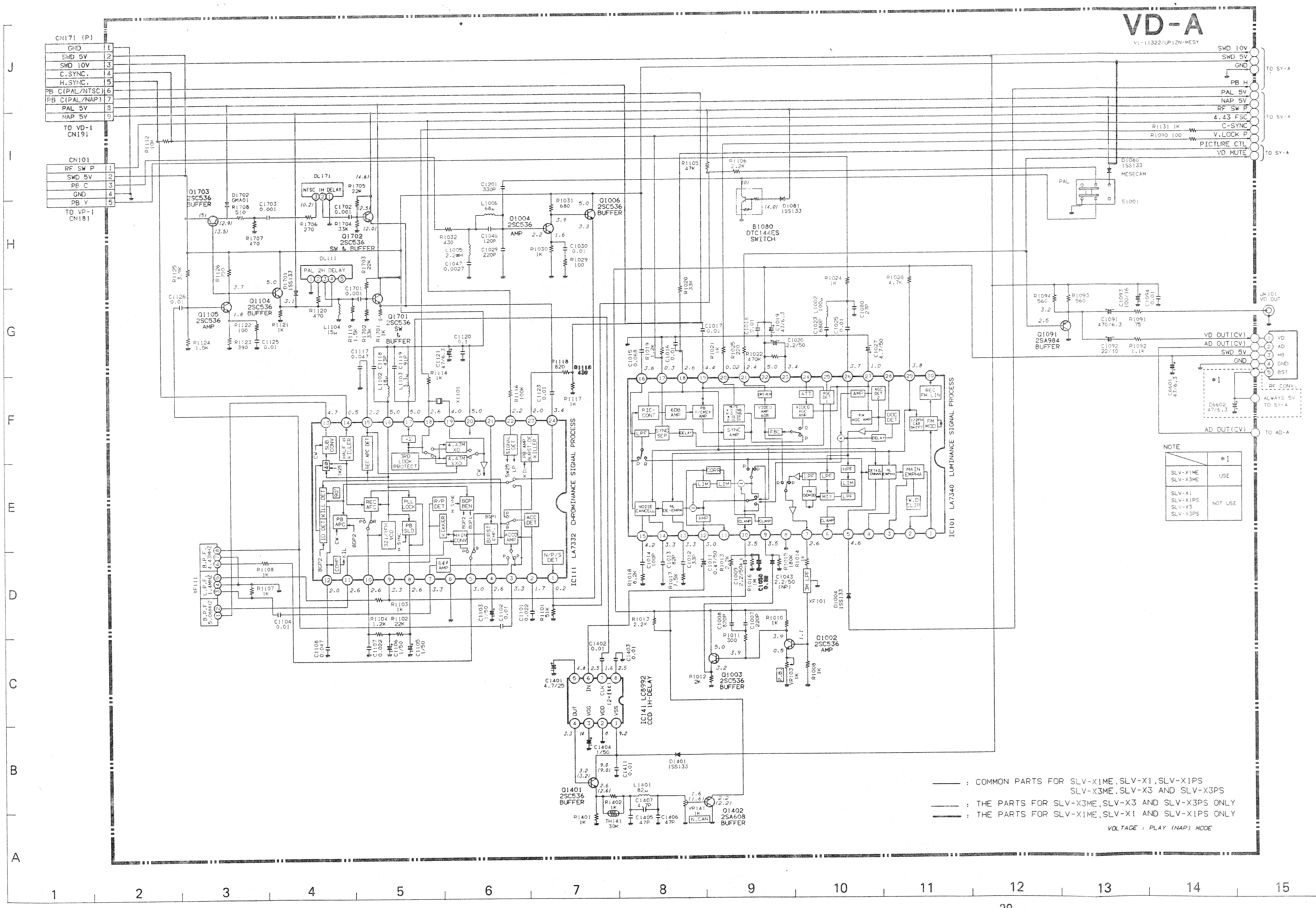

AC4B 11A26600A
COMPL
RF
GND
EN
CN201
JW101
VR201
DL171
DL111
IC111
IC141
IC101
VR141
XF101
XF111
X1101
CN101
CN171
R1106
R1116
R1118
R1114
C1117
C1108
C1107
R1103
R1104
R1102
C1105
C1104
C1106
R1107
R1108
C1126
R1124
R1125
Q1105
C1125
R1707
C1703
R1706
R1708
Q1703
Q1702
R1123
R1122
Q1701
R1105
D1701
D1702
C1403
C1411
C1404
C1401
Q1402
Q1401
D1401
C1201
Q1004
R1032
C1047
L1005
C1019
R1024
C1029
C1050
R1016
R1014
R1008
R1022
R1015
R1010
Q1002
Q1003
R1301
L1301
C1301
R1012
R1011
C1008
PB
1 2 3


AD- A
A1-11311/UP1ZN-ME
C2050
47/16
SWD 10V
R2050
220
TO SY-A
R2009
820
R2011
8.2K
JK201
AD LINE OUT
009
/6.3
R2010
820
R2014
10K
AD OUT(CV)
TO VD-A
5
AD MUTE
TO SY-A
R2018
4.7K


S1001
JK101 VD
JK201 AD
VD AD MB GND BST
CONV.
COMPL PW-A
COMPL AD-A
COMPL SY-A
CN351
CN352
CN303
CP-1
OJCI-N1S
JW101
Y2001
1AC4B11A26600A
COMPL VD-A
RF SW P
GND
ENV
COMPL SY-A
CN302
CN301
IC301
IC331
IC201
IC352
IC101
IC111
IC141
XF111
XF101
XF301
XF331
VR351 SW VR371
NTSC
PAL
PB
DL171
DL111
CN304
CN305
IC302
IC303

8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

CP-1 BOARD (VD-A) VIDEO CIRCUIT DIAGRAM

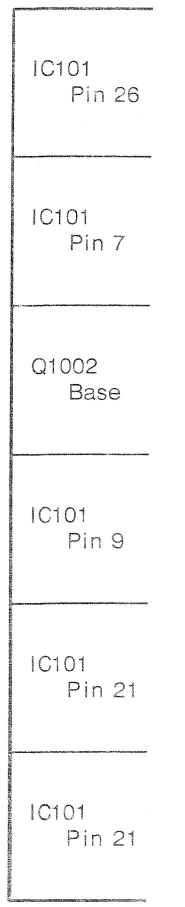

VD-A
CN171 (P)
GND
SWD 5V
SWD 10V
C.SYNC.
H.SYNC.
PB C(PAL/NTSC)
PB C(PAL/NAP)
PAL 5V
NAP 5V
TO VD-1 CN191
CN101
RF SW P
SWD 5V
PB C
GND
PB Y
TO VP-1 CN181
Q1703 2SC536 BUFFER
Q1702 2SC536 SW & BUFFER
DL171 NTSC 1H DELAY
DL111 PAL 2H DELAY
Q1104 2SC536 BUFFER
Q1105 2SC536 AMP
Q1701 2SC536 SW & BUFFER
Q1004 2SC536 AMP
Q1006 2SC536 BUFFER
B1080 DTC144ES SWITCH
D1081 1SS133
D1060 1SS133 MESECAM
S1001
PAL
SWD 10V
SWD 5V
GND
PB H
PAL 5V
NAP 5V
RF SW P
4.43 FSC
C-SYNC
V.LOCK P
PICTURE CTL
VD MUTE
TO SY-A
J5101 VD OUT
Q1091 2SA984 BUFFER
VD OUT(CV)
AD OUT(CV)
SWD 5V
GND
AD OUT(CV)
TO AD-A
RF CONV
ALWAYS 5V TO SY-A
IC111 LA7332 CHROMINANCE SIGNAL PROCESS
IC101 LA7340 LUMINANCE SIGNAL PROCESS
XF111
XF101
Q1002 2SC536 AMP
Q1003 2SC536 BUFFER
D1004 1SS133
IC141 LC8992 CCD 1H-DELAY
Q1401 2SC536 BUFFER
Q1402 2SA608 BUFFER
D1401 1SS133
TH141 30K
VOLTAGE : PLAY (NAP) MODE
J
I
H
G
F
E
D
C
B
A
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16

NOTE

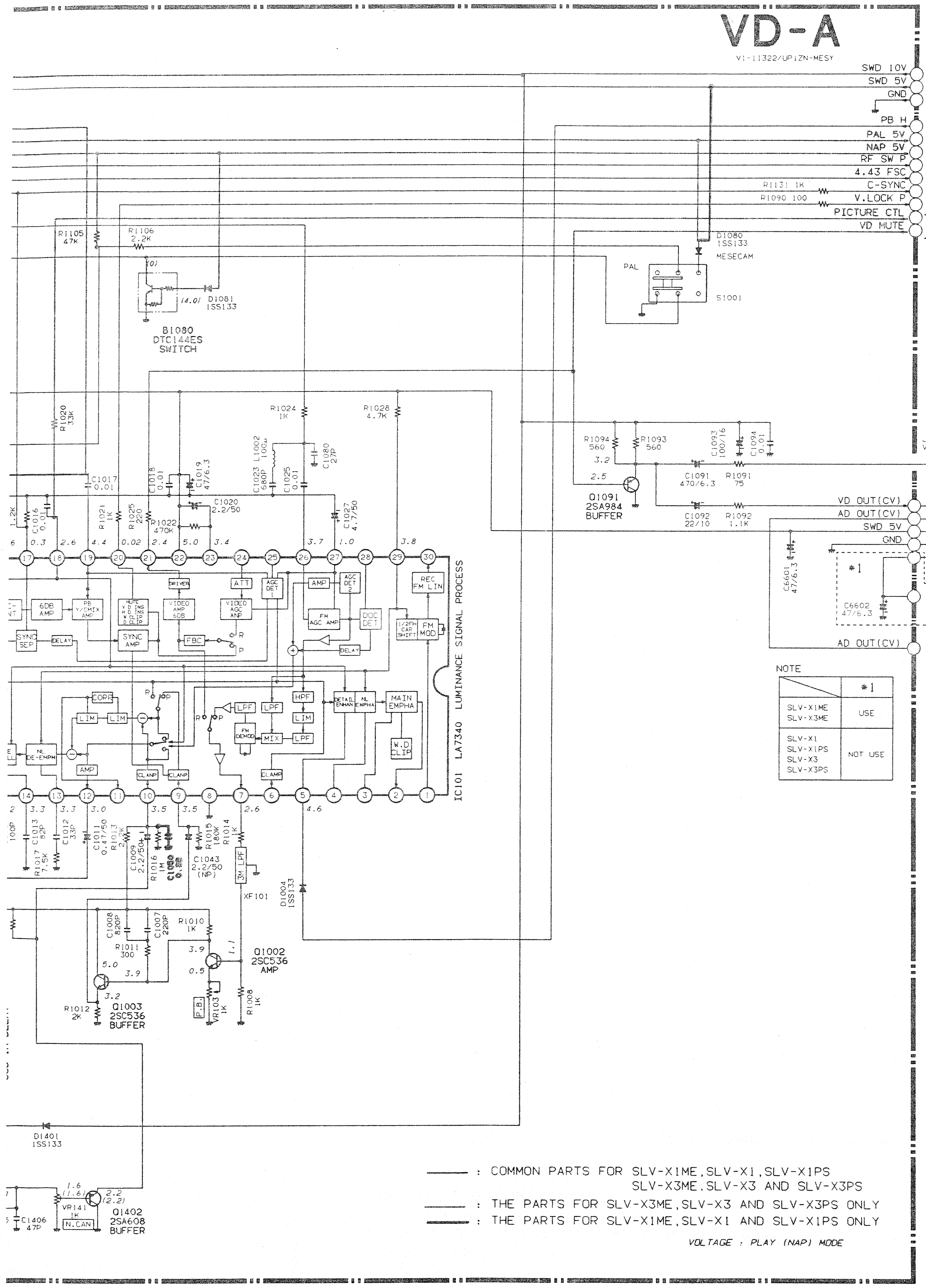
	*1
SLV-X1ME SLV-X3ME	USE
SLV-X1 SLV-X1PS SLV-X3 SLV-X3PS	NOT USE

——— : COMMON PARTS FOR SLV-X1ME, SLV-X1, SLV-X1PS
SLV-X3ME, SLV-X3 AND SLV-X3PS
——— : THE PARTS FOR SLV-X3ME, SLV-X3 AND SLV-X3PS ONLY
——— : THE PARTS FOR SLV-X1ME, SLV-X1 AND SLV-X1PS ONLY

WAVEFOR


IC101 Pin 26
IC101 Pin 7
Q1002 Base
IC101 Pin 9
IC101 Pin 21
IC101 Pin 21

VIDEO CIRCUIT DIAGRAM


VD-A
SWD 10V
SWD 5V
GND
TO SY-A
PB H
PAL 5V
NAP 5V
RF SW P
4.43 FSC
C-SYNC
V.LOCK P
PICTURE CTL
VD MUTE
TO SY-A
TO SY-A
D1080 1SS133
MESECAM
PAL
S1001
D1081 1SS133
B1080 DTC144ES SWITCH
Q1091 2SA984 BUFFER
J101 VD OUT
VD OUT(CV)
AD OUT(CV)
SWD 5V
GND
VD
AD
MB
GND
BST
RF CONV.
ALWAYS 5V TO SY-A
AD OUT(CV)
TO AD-A
IC101 LA7340 LUMINANCE SIGNAL PROCESS
Q1002 2SC536 AMP
Q1003 2SC536 BUFFER
XF101
D1004 1SS133
D1401 1SS133
Q1402 2SA608 BUFFER
VR141
N.CAN

NOTE

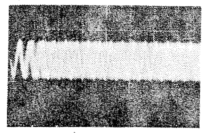
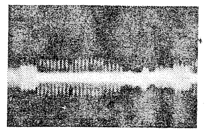
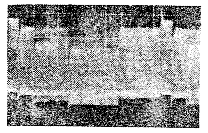
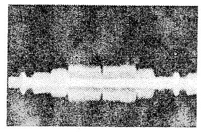
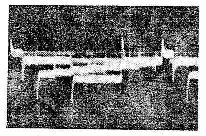
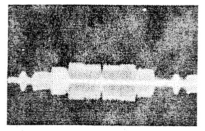
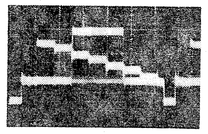
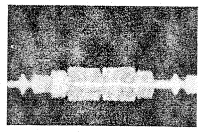
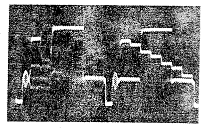
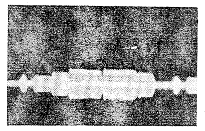
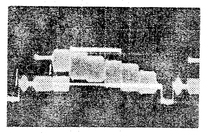
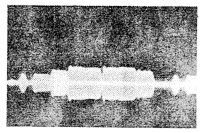
	*1
SLV-X1ME SLV-X3ME	USE
SLV-X1 SLV-X1PS SLV-X3 SLV-X3PS	NOT USE

——— : COMMON PARTS FOR SLV-X1ME, SLV-X1, SLV-X1PS
SLV-X3ME, SLV-X3 AND SLV-X3PS
——— : THE PARTS FOR SLV-X3ME, SLV-X3 AND SLV-X3PS ONLY
——— : THE PARTS FOR SLV-X1ME, SLV-X1 AND SLV-X1PS ONLY

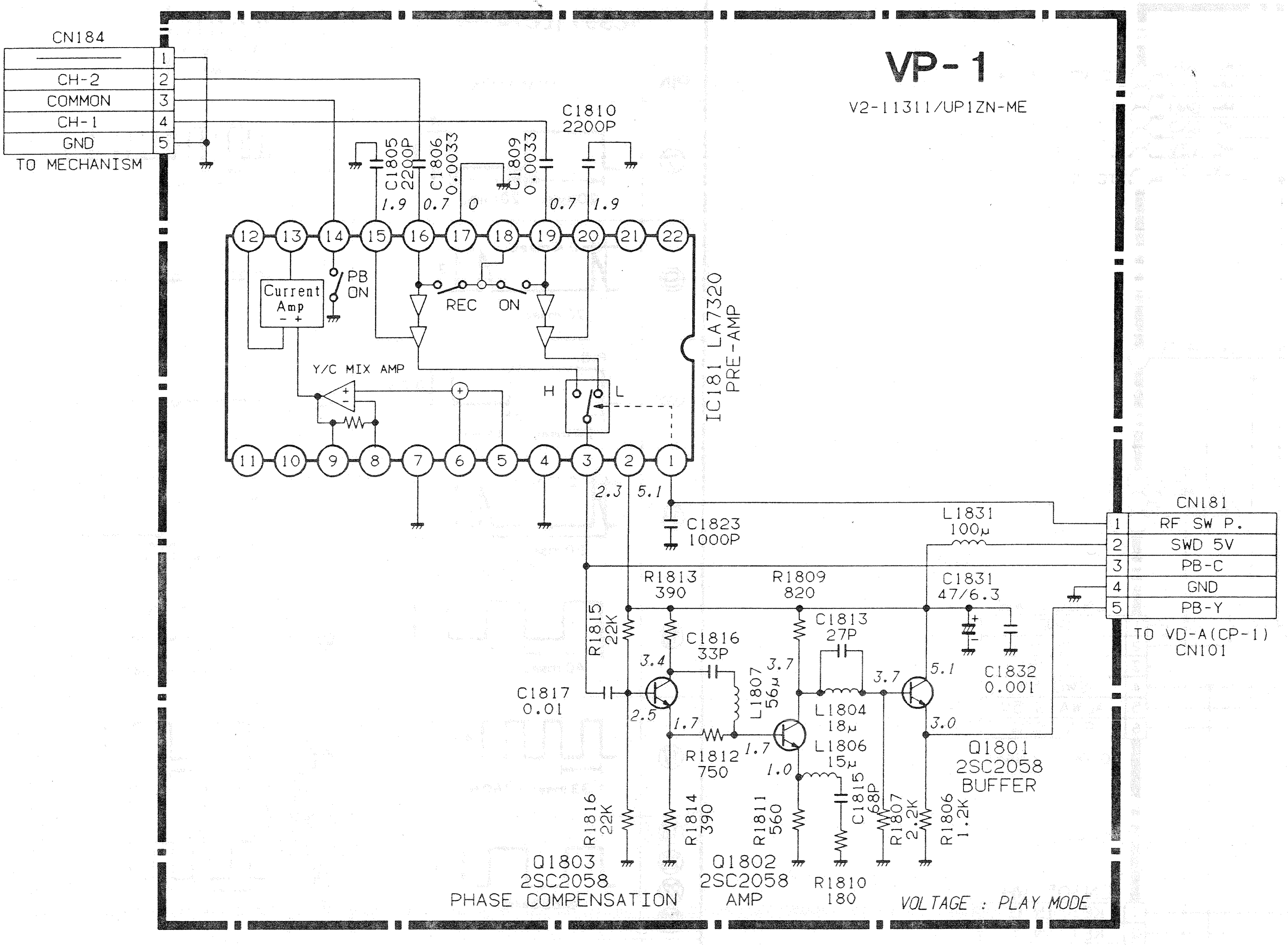
VOLTAGE : PLAY (NAP) MODE

WAVEFORM OF VIDEO

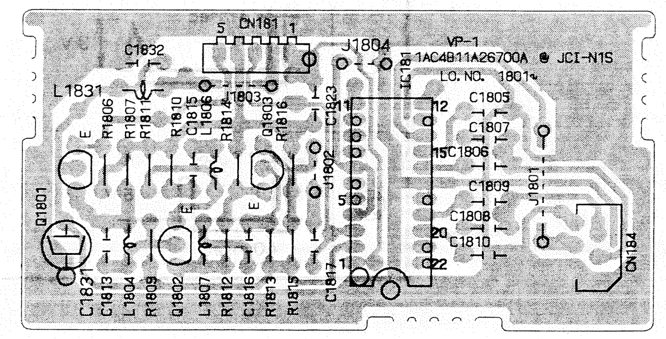
WF-VUP

IC101 Pin 26		PAL 0.3 Vp-p	Q1004 Base		PAL 0.1 Vp-p
IC101 Pin 7		PAL 2.0 Vp-p	Q1006 Emitter		PAL 0.8 Vp-p
Q1002 Base		PAL 0.5 Vp-p	IC111 Pin 7		PAL 0.3 Vp-p
IC101 Pin 9		PAL 0.6 Vp-p	IC111 Pin 5		PAL 1.2 Vp-p
IC101 Pin 21		NAP 2 Vp-p	IC111 Pin 24		PAL 0.24 Vp-p
IC101 Pin 21		PAL 2 Vp-p	IC111 Pin 23		PAL 0.7 Vp-p

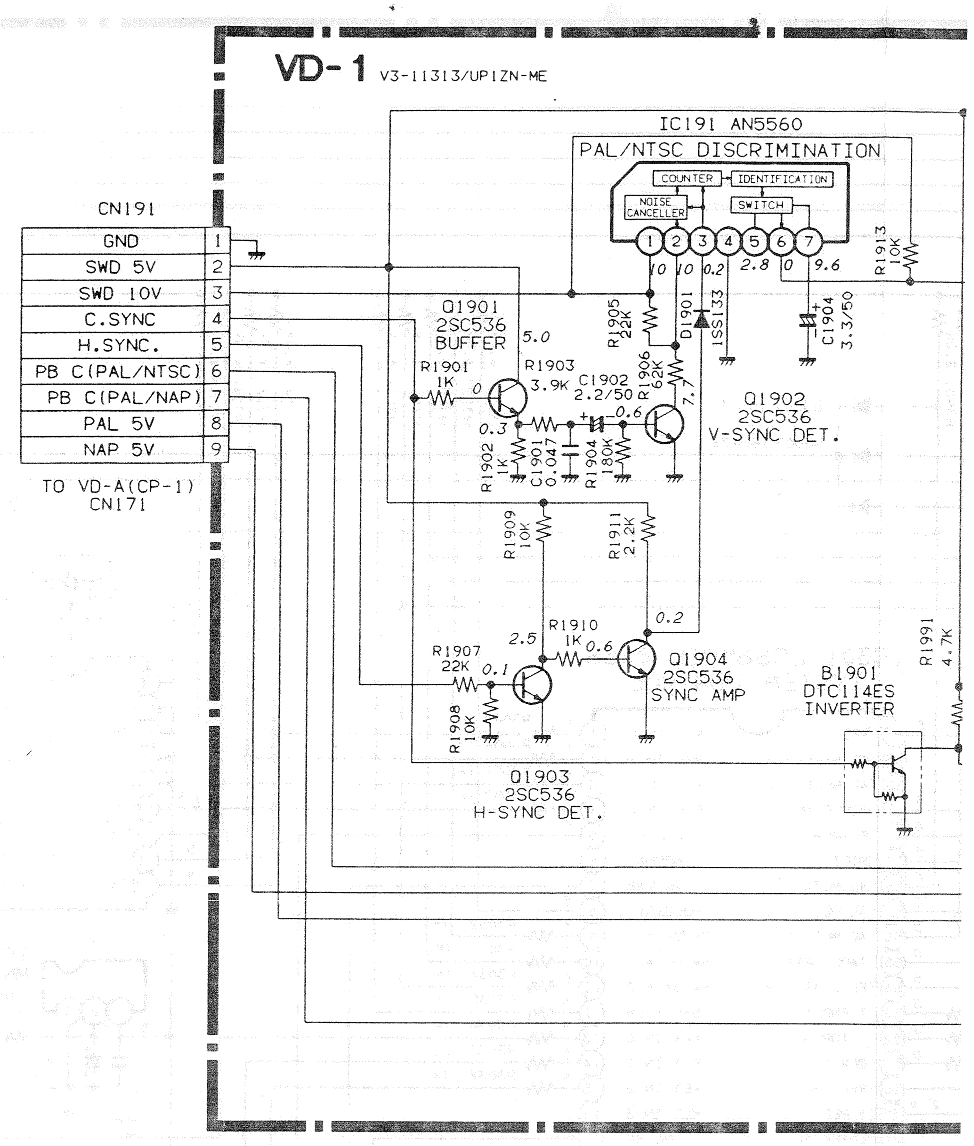
VP-1 BOARD VIDEO PRE-AMP CIRCUIT DIAGRAM


VP-1
V2-11311/UP1ZN-ME
CN184
CH-2
COMMON
CH-1
GND
TO MECHANISM
C1810 2200P
C1805 2200P
C1806 0.0033
C1809 0.0033
Current Amp
PB ON
REC ON
Y/C MIX AMP
H L
IC181 LA7320 PRE-AMP
C1823 1000P
L1831 100μ
CN181
RF SW P.
SWD 5V
PB-C
GND
PB-Y
TO VD-A(CP-1) CN101
R1813 390
R1809 820
C1831 47/6.3
R1815 22K
C1816 33P
C1813 27P
L1807 56μ
C1817 0.01
L1804 18μ
L1806 15μ
C1832 0.001
R1812 750
C1815 68P
R1816 22K
R1814 390
R1811 560
R1807 2.2K
R1806 1.2K
Q1801 2SC2058 BUFFER
Q1803 2SC2058 PHASE COMPENSATION
Q1802 2SC2058 AMP
R1810 180
VOLTAGE : PLAY MODE

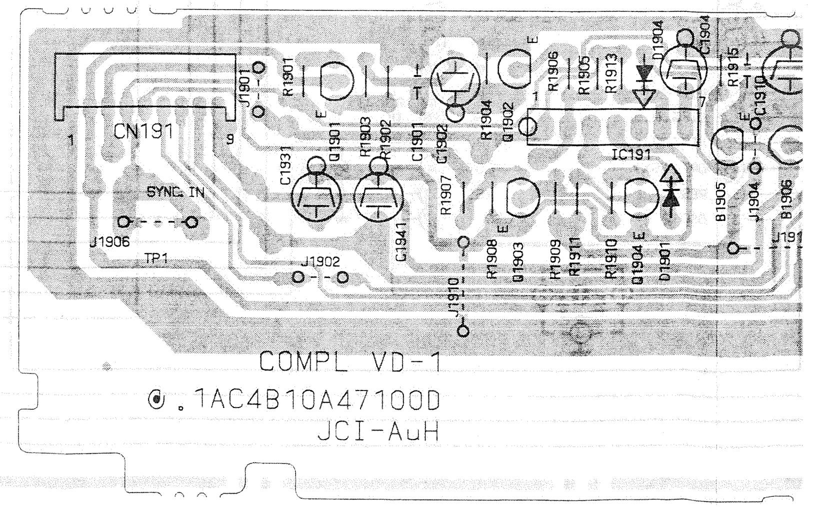
VP-1 P.C.B.


CN181
VP-1
1AC4B11A26700A @ JCI-N15
LO. NO. 1801
L1831
Q1801
IC181
CN184

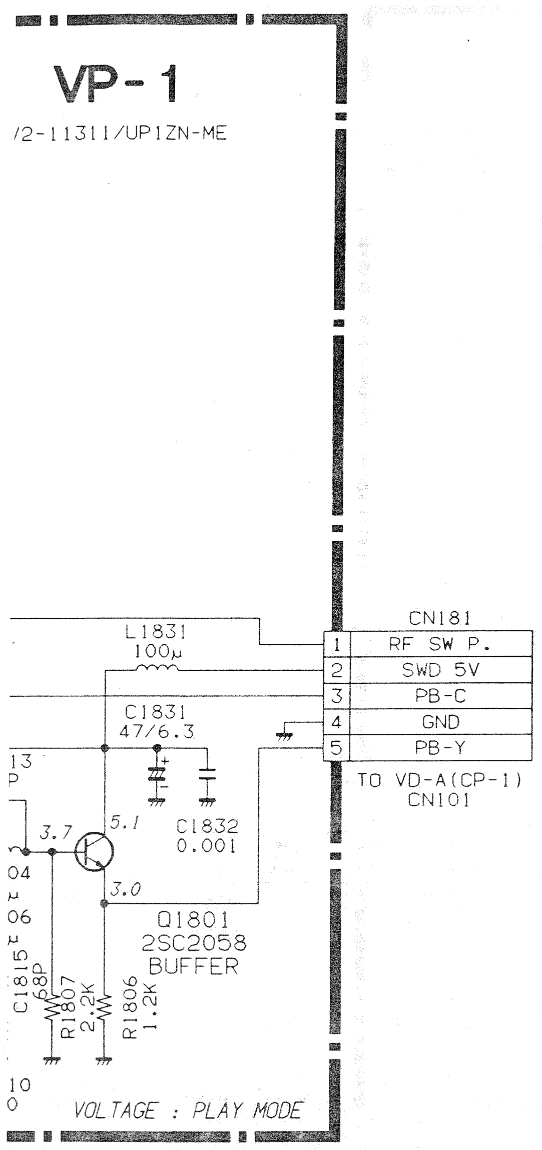
VD-1 BOARD NAP CIRCUIT DIA

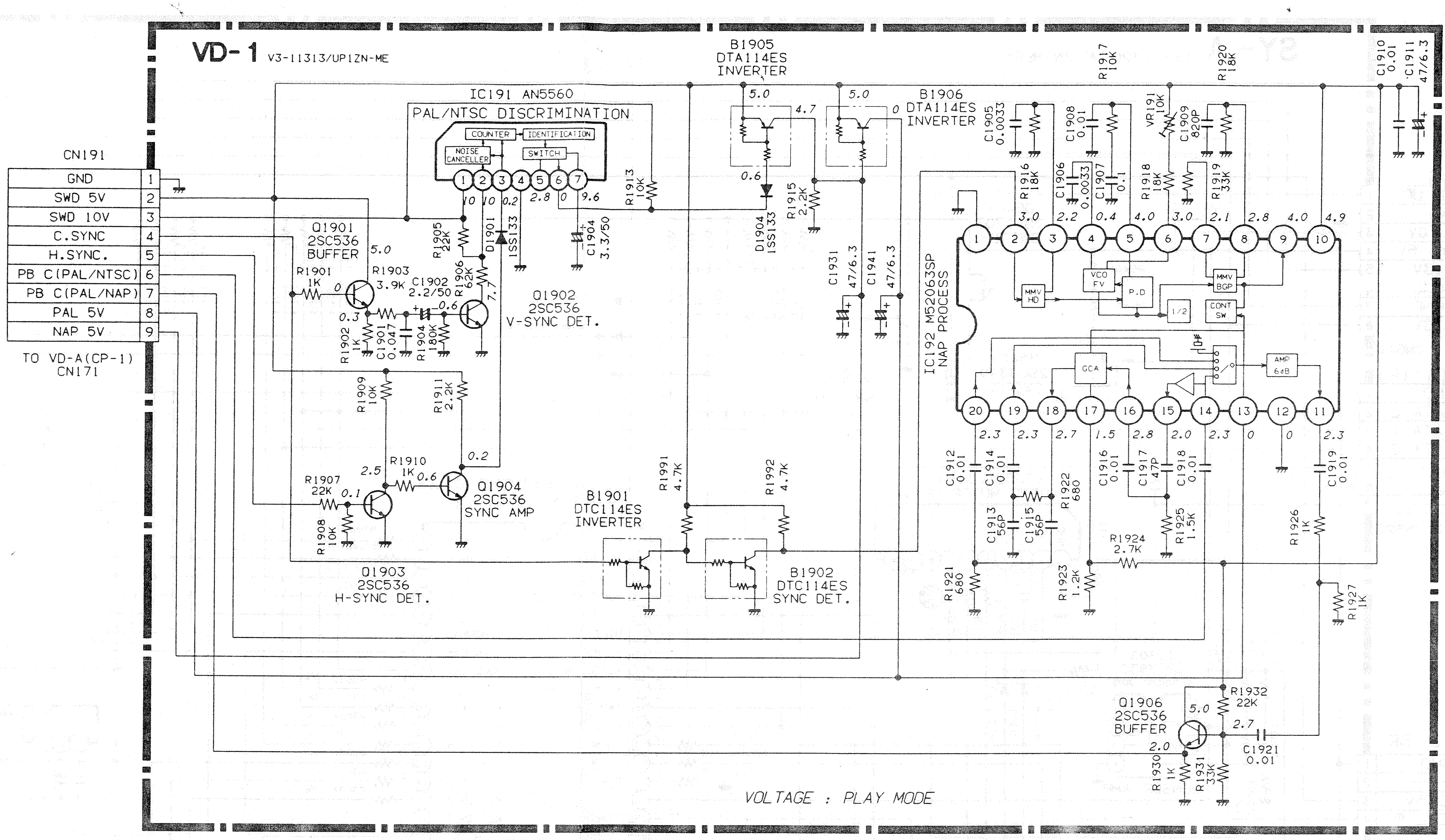

VD-1 V3-11313/UP1ZN-ME
IC191 AN5560
PAL/NTSC DISCRIMINATION
COUNTER
IDENTIFICATION
NOISE CANCELLER
SWITCH
CN191
GND
SWD 5V
SWD 10V
C.SYNC
H.SYNC.
PB C(PAL/NTSC)
PB C(PAL/NAP)
PAL 5V
NAP 5V
TO VD-A(CP-1) CN171
Q1901 2SC536 BUFFER
Q1902 2SC536 V-SYNC DET.
Q1903 2SC536 H-SYNC DET.
Q1904 2SC536 SYNC AMP
B1901 DTC114ES INVERTER
R1913 10K
C1904 3.3/50
D1901 1SS133
R1901 1K
R1903 3.9K
C1902 2.2/50
R1905 22K
R1906 62K
R1902 1K
C1901 0.047
R1904 180K
R1909 10K
R1911 2.2K
R1910 1K
R1907 22K
R1908 10K
R1991 4.7K

VD-1 P.C.B. (SLV-X

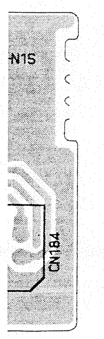

CN191
IC191
SYNC IN
J1906
TP1
J1902
COMPL VD-1
@.1AC4B10A47100D
JCI-AuH

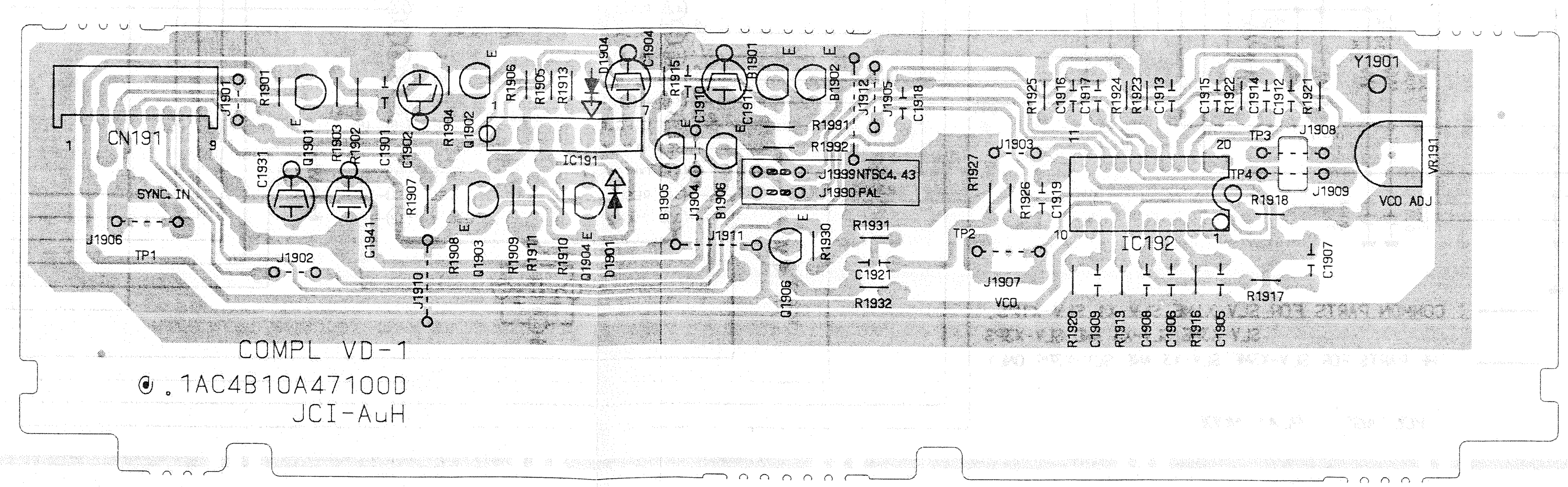
VD-1 BOARD NAP CIRCUIT DIAGRAM (SLV-X3ME, SLV-X3PS, SLV-X3)


VP-1
/2-11311/UP1ZN-ME
CN181
RF SW P.
SWD 5V
PB-C
GND
PB-Y
TO VD-A(CP-1) CN101
L1831 100μ
C1831 47/6.3
C1832 0.001
Q1801 2SC2058 BUFFER
C1815 68P
R1807 2.2K
R1806 1.2K
VOLTAGE : PLAY MODE


VD-1 V3-11313/UP1ZN-ME
CN191
GND
SWD 5V
SWD 10V
C.SYNC
H.SYNC.
PB C(PAL/NTSC)
PB C(PAL/NAP)
PAL 5V
NAP 5V
TO VD-A(CP-1) CN171
IC191 AN5560
PAL/NTSC DISCRIMINATION
COUNTER
IDENTIFICATION
NOISE CANCELLER
SWITCH
B1905 DTA114ES INVERTER
B1906 DTA114ES INVERTER
Q1901 2SC536 BUFFER
Q1902 2SC536 V-SYNC DET.
Q1903 2SC536 H-SYNC DET.
Q1904 2SC536 SYNC AMP
B1901 DTC114ES INVERTER
B1902 DTC114ES SYNC DET.
D1901 1SS133
D1904 1SS133
IC192 M52063SP NAP PROCESS
VCO FV
P.D
MMV HD
MMV BGP
CONT SW
1/2
GCA
AMP 6dB
Q1906 2SC536 BUFFER
VOLTAGE : PLAY MODE

VD-1 P.C.B. (SLV-X3ME, SLV-X3PS, SLV-X3)




CN191
SYNC. IN
TP1
IC191
IC192
Y1901
VR191
VCO ADJ
J1989 NTSC4. 43
J1990 PAL
TP2
TP3
TP4
VCO
COMPL VD-1
1AC4B10A47100D
JCI-AuH

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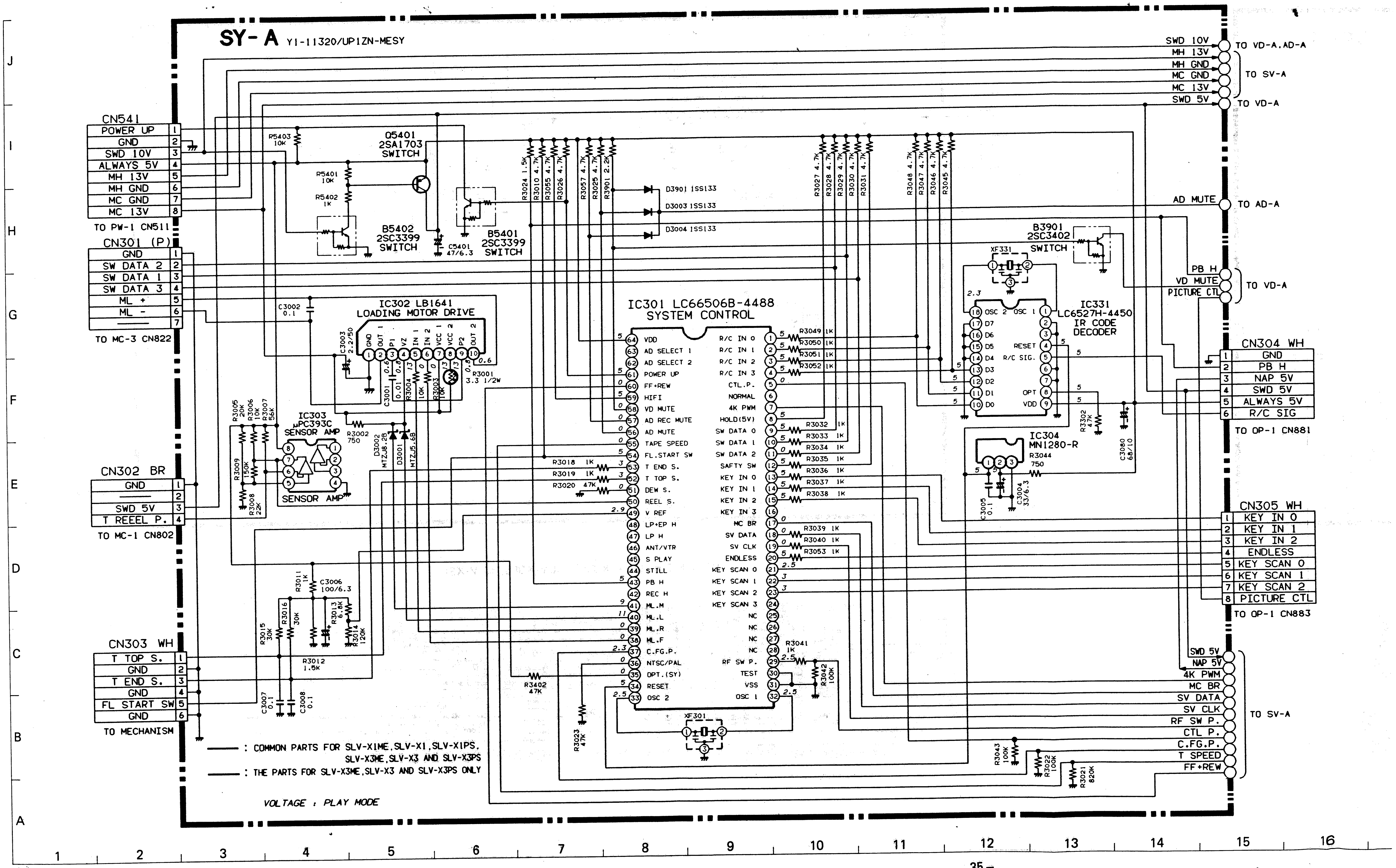
CP-1 BOARD (SY-A) SYSTEM CONTROL CIRCUIT DIAGRAM


SY-A Y1-11320/UP1ZN-MESY
CN541
POWER UP
GND
SWD 10V
ALWAYS 5V
MH 13V
MH GND
MC GND
MC 13V
TO PW-1 CN511
CN301 (P)
GND
SW DATA 2
SW DATA 1
SW DATA 3
ML +
ML -
TO MC-3 CN822
CN302 BR
GND
SWD 5V
T REEL P.
TO MC-1 CN802
CN303 WH
T TOP S.
GND
T END S.
GND
FL START SW
GND
TO MECHANISM
R5403 10K
Q5401 2SA1703 SWITCH
R5401 10K
R5402 1K
B5402 2SC3399 SWITCH
C5401 47/6.3
B5401 2SC3399 SWITCH
R3024 1.5K
R3010 4.7K
R3055 4.7K
R3026 4.7K
R3057 4.7K
R3025 4.7K
R3901 2.2K
D3901 1SS133
D3003 1SS133
D3004 1SS133
R3027 4.7K
R3028 4.7K
R3029 4.7K
R3030 4.7K
R3031 4.7K
R3048 4.7K
R3047 4.7K
R3046 4.7K
R3045 4.7K
B3901 2SC3402 SWITCH
XF331
C3002 0.1
IC302 LB1641 LOADING MOTOR DRIVE
GND
OUT 1
P1
VZ
IN 1
IN 2
VCC 1
VCC 2
P2
OUT 2
C3003 2.2/50
C3001 0.01
R3004 10K
R3003 10K
R3001 3.3 1/2W
IC303 µPC393C SENSOR AMP
R3005 20K
R3006 10K
R3007 56K
R3009 150K
R3008 22K
R3002 750
D3002 MTZJ8.2B
D3001 MTZJ5.6B
SENSOR AMP
IC301 LC66506B-4488 SYSTEM CONTROL
VDD
AD SELECT 1
AD SELECT 2
POWER UP
FF+REW
HIFI
VD MUTE
AD REC MUTE
AD MUTE
TAPE SPEED
FL.START SW
T END S.
T TOP S.
DEW S.
REEL S.
V REF
LP+EP H
LP H
ANT/VTR
S PLAY
STILL
PB H
REC H
ML.M
ML.L
ML.R
ML.F
C.FG.P.
NTSC/PAL
OPT.(SY)
RESET
OSC 2
R/C IN 0
R/C IN 1
R/C IN 2
R/C IN 3
CTL.P.
NORMAL
4K PWM
HOLD(5V)
SW DATA 0
SW DATA 1
SW DATA 2
SAFTY SW
KEY IN 0
KEY IN 1
KEY IN 2
KEY IN 3
MC BR
SV DATA
SV CLK
ENDLESS
KEY SCAN 0
KEY SCAN 1
KEY SCAN 2
KEY SCAN 3
NC
RF SW P.
TEST
VSS
OSC 1
R3018 1K
R3019 1K
R3020 47K
R3049 1K
R3050 1K
R3051 1K
R3052 1K
R3032 1K
R3033 1K
R3034 1K
R3035 1K
R3036 1K
R3037 1K
R3038 1K
R3039 1K
R3040 1K
R3053 1K
R3041 1K
R3042 100K
R3011 1K
C3006 100/6.3
R3015 30K
R3016 30K
R3013 6.8K
R3014 120K
R3012 1.5K
C3007 0.1
C3008 0.1
R3402 47K
R3023 47K
XF301
IC331 LC6527H-4450 IR CODE DECODER
OSC 2
OSC 1
D7
D6
D5
D4
D3
D2
D1
D0
RESET
R/C SIG.
OPT
VDD
R3302 47K
C3080 68/10
IC304 MN1280-R
R3044 750
C3005 0.1
C3004 33/6.3
R3043 100K
R3022 100K
R3021 820K
SWD 10V
MH 13V
MH GND
MC GND
MC 13V
SWD 5V
TO VD-A, AD-A
TO SV-A
TO VD-A
AD MUTE
TO AD-A
PB H
VD MUTE
PICTURE CTL
TO VD-A
CN304 WH
GND
PB H
NAP 5V
SWD 5V
ALWAYS 5V
R/C SIG
TO OP-1 CN881
CN305 WH
KEY IN 0
KEY IN 1
KEY IN 2
ENDLESS
KEY SCAN 0
KEY SCAN 1
KEY SCAN 2
PICTURE CTL
TO OP-1 CN883
SWD 5V
NAP 5V
4K PWM
MC BR
SV DATA
SV CLK
RF SW P.
CTL P.
C.FG.P.
T SPEED
FF+REW
TO SV-A
A
B
C
D
E
F
G
H
I
J
1
2
3
4
5
6
7
8
9
10
11
12
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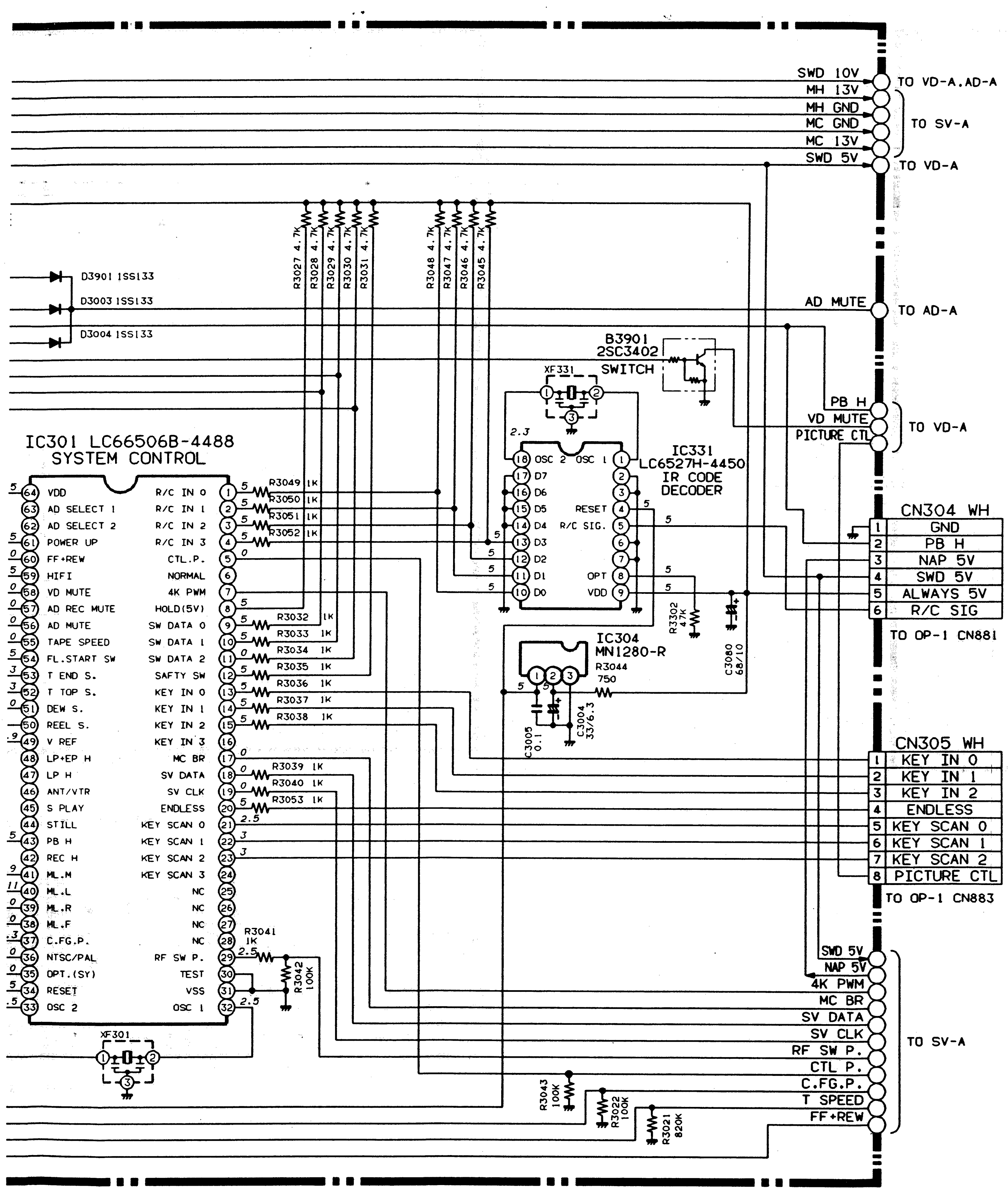
14
15
16

—— : COMMON PARTS FOR SLV-X1ME, SLV-X1, SLV-X1PS, SLV-X3ME, SLV-X3 AND SLV-X3PS

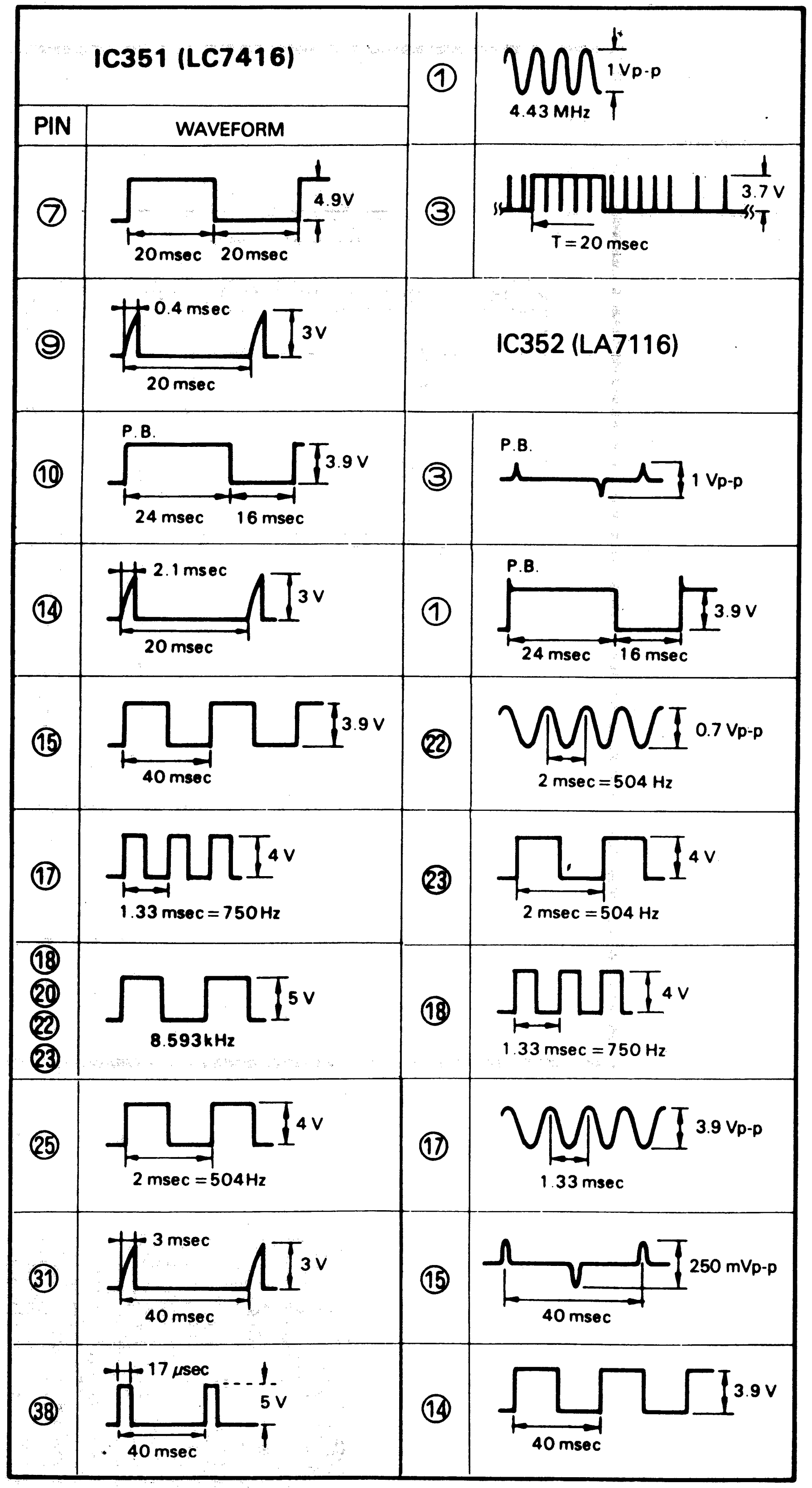
—— : THE PARTS FOR SLV-X3ME, SLV-X3 AND SLV-X3PS ONLY

VOLTAGE : PLAY MODE

-A) SYSTEM CONTROL CIRCUIT DIAGRAM

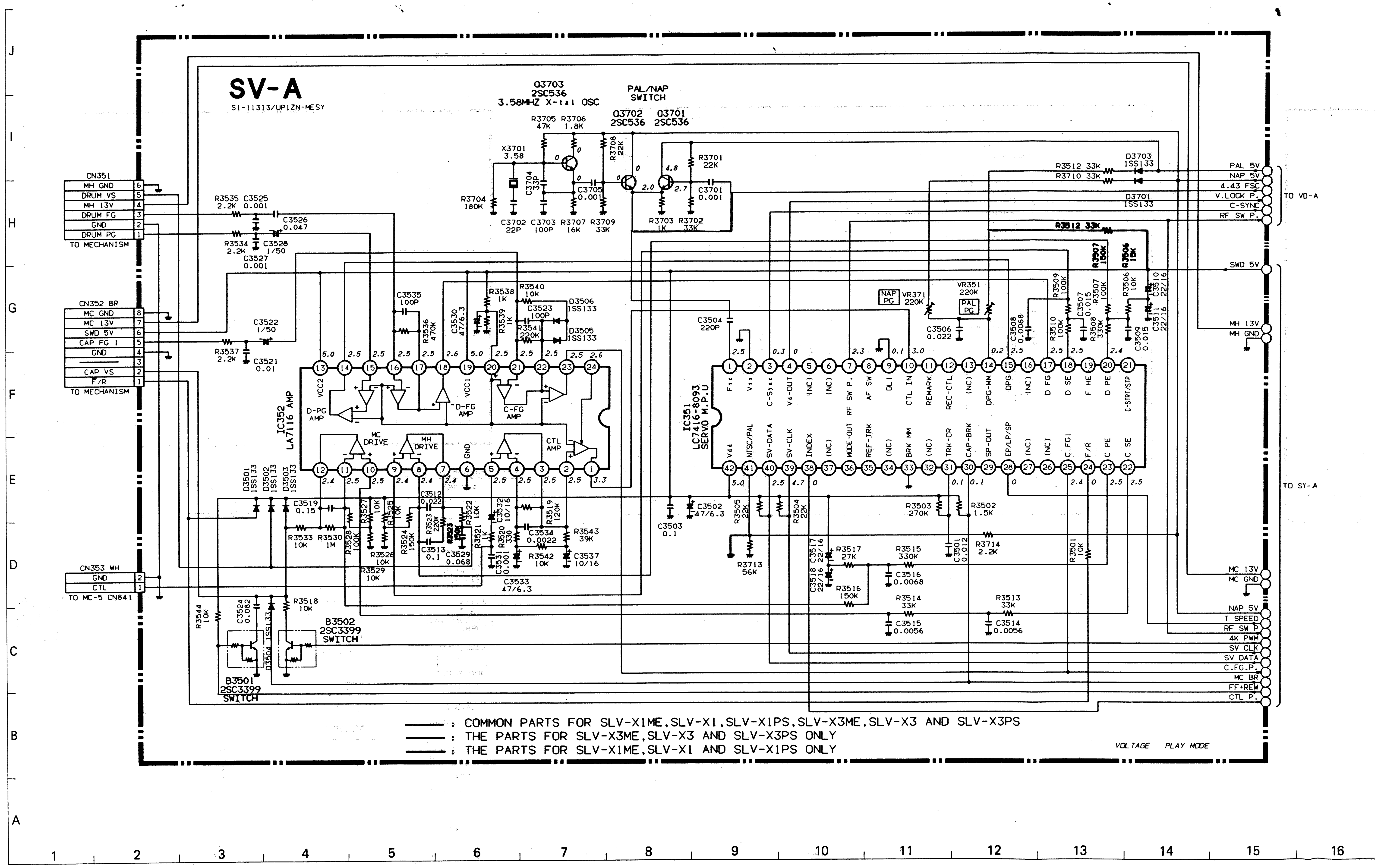

IC301 LC66506B-4488
SYSTEM CONTROL
VDD
AD SELECT 1
AD SELECT 2
POWER UP
FF+REW
HIFI
VD MUTE
AD REC MUTE
AD MUTE
TAPE SPEED
FL.START SW
T END S.
T TOP S.
DEW S.
REEL S.
V REF
LP+EP H
LP H
ANT/VTR
S PLAY
STILL
PB H
REC H
ML.M
ML.L
ML.R
ML.F
C.FG.P.
NTSC/PAL
OPT.(SY)
RESET
OSC 2
R/C IN 0
R/C IN 1
R/C IN 2
R/C IN 3
CTL.P.
NORMAL
4K PWM
HOLD(5V)
SW DATA 0
SW DATA 1
SW DATA 2
SAFTY SW
KEY IN 0
KEY IN 1
KEY IN 2
KEY IN 3
MC BR
SV DATA
SV CLK
ENDLESS
KEY SCAN 0
KEY SCAN 1
KEY SCAN 2
KEY SCAN 3
NC
RF SW P.
TEST
VSS
OSC 1
XF301
D3901 1SS133
D3003 1SS133
D3004 1SS133
R3027 4.7K
R3028 4.7K
R3029 4.7K
R3030 4.7K
R3031 4.7K
R3048 4.7K
R3047 4.7K
R3046 4.7K
R3045 4.7K
R3049 1K
R3050 1K
R3051 1K
R3052 1K
R3032 1K
R3033 1K
R3034 1K
R3035 1K
R3036 1K
R3037 1K
R3038 1K
R3039 1K
R3040 1K
R3053 1K
R3041 1K
R3042 100K
R3043 100K
R3022 100K
R3021 820K
B3901
2SC3402
SWITCH
XF331
IC331
LC6527H-4450
IR CODE
DECODER
OSC 2
OSC 1
D7
D6
D5
D4
D3
D2
D1
D0
RESET
R/C SIG.
OPT
VDD
R3302 47K
C3080 68/10
IC304
MN1280-R
R3044 750
C3005 0.1
C3004 33/6.3
SWD 10V
MH 13V
MH GND
MC GND
MC 13V
SWD 5V
TO VD-A.AD-A
TO SV-A
TO VD-A
AD MUTE
TO AD-A
PB H
VD MUTE
PICTURE CTL
TO VD-A
CN304 WH
1 GND
2 PB H
3 NAP 5V
4 SWD 5V
5 ALWAYS 5V
6 R/C SIG
TO OP-1 CN881
CN305 WH
1 KEY IN 0
2 KEY IN 1
3 KEY IN 2
4 ENDLESS
5 KEY SCAN 0
6 KEY SCAN 1
7 KEY SCAN 2
8 PICTURE CTL
TO OP-1 CN883
SWD 5V
NAP 5V
4K PWM
MC BR
SV DATA
SV CLK
RF SW P.
CTL P.
C.FG.P.
T SPEED
FF+REW
TO SV-A

WAVEFORM OF SERVO

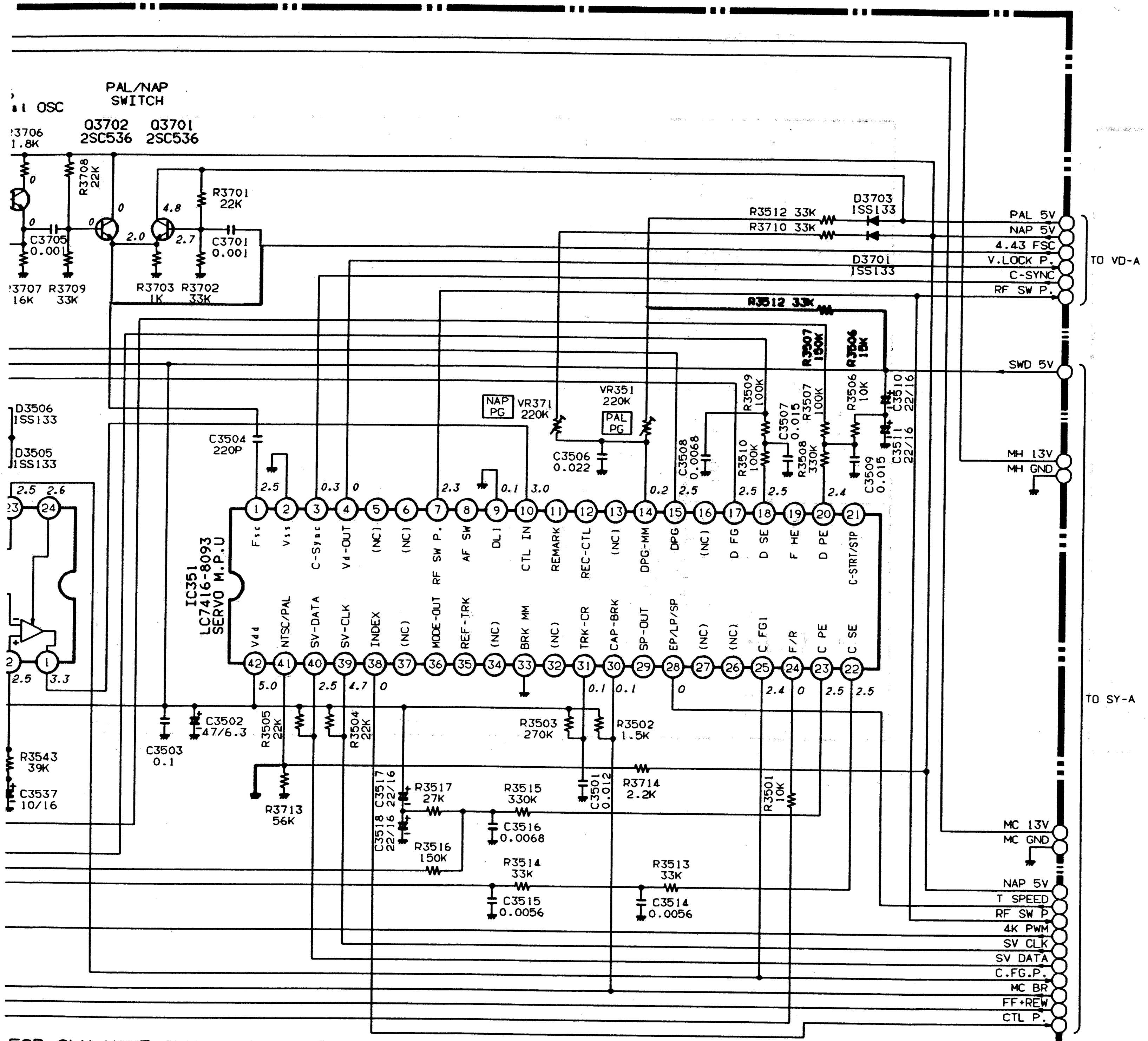

IC351 (LC7416)
PIN
WAVEFORM
⑦ 4.9V 20msec 20msec
⑨ 0.4 msec 3V 20 msec
⑩ P.B. 3.9V 24 msec 16 msec
⑭ 2.1 msec 3V 20 msec
⑮ 3.9 V 40 msec
⑰ 4 V 1.33 msec = 750 Hz
⑱ ⑳ ㉒ ㉓ 5 V 8.593 kHz
㉕ 4 V 2 msec = 504 Hz
㉛ 3 msec 3V 40 msec
㊳ 17 μsec 5 V 40 msec
① 1 Vp-p 4.43 MHz
③ 3.7 V T = 20 msec
IC352 (LA7116)
③ P.B. 1 Vp-p
① P.B. 3.9 V 24 msec 16 msec
㉒ 0.7 Vp-p 2 msec = 504 Hz
㉓ 4 V 2 msec = 504 Hz
⑱ 4 V 1.33 msec = 750 Hz
⑰ 3.9 Vp-p 1.33 msec
⑮ 250 mVp-p 40 msec
⑭ 3.9 V 40 msec

8 9 10 11 12 13 14 15 16 17 18 19 20 21 22

CP-1 BOARD (SV-A) SERVO CIRCUIT DIAGRAM


SV-A
S1-11313/UP1ZN-MESY
Q3703 2SC536 3.58MHZ X-tal OSC
PAL/NAP SWITCH
Q3702 2SC536
Q3701 2SC536
X3701 3.58
CN351
MH GND
DRUM VS
MH 13V
DRUM FG
GND
DRUM PG
TO MECHANISM
CN352 BR
MC GND
MC 13V
SWD 5V
CAP FG I
GND
CAP VS
F/R
TO MECHANISM
CN353 WH
GND
CTL
TO MC-5 CN841
IC352 LA7116 AMP
D-PG AMP
D-FG AMP
C-FG AMP
MC DRIVE
MH DRIVE
CTL AMP
VCC2
VCC1
GND
IC351 LC7416-8093 SERVO M.P.U
F.sc
Vss
C-Sync
V4-OUT
(NC)
RF SW P.
AF SW
DL1
CTL IN
REMARK
REC-CTL
DPG-MM
DPG
D FG
D SE
F HE
D PE
C-STRT/STP
Vdd
NTSC/PAL
SV-DATA
SV-CLK
INDEX
MODE-OUT
REF-TRK
BRK MM
TRK-CR
CAP-BRK
SP-OUT
EP/LP/SP
C FG1
F/R
C PE
C SE
NAP PG
VR371 220K
VR351 220K
PAL PG
B3501 2SC3399 SWITCH
B3502 2SC3399 SWITCH
D3701 1SS133
D3703 1SS133
PAL 5V
NAP 5V
4.43 FSC
V.LOCK P.
C-SYNC
RF SW P.
TO VD-A
SWD 5V
MH 13V
MH GND
TO SY-A
MC 13V
MC GND
NAP 5V
T SPEED
RF SW P
4K PWM
SV CLK
SV DATA
C.FG.P.
MC BR
FF+REW
CTL P.
——— : COMMON PARTS FOR SLV-X1ME, SLV-X1, SLV-X1PS, SLV-X3ME, SLV-X3 AND SLV-X3PS
——— : THE PARTS FOR SLV-X3ME, SLV-X3 AND SLV-X3PS ONLY
——— : THE PARTS FOR SLV-X1ME, SLV-X1 AND SLV-X1PS ONLY
VOLTAGE PLAY MODE
J
I
H
G
F
E
D
C
B
A
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16

BOARD (SV-A) SERVO CIRCUIT DIAGRAM

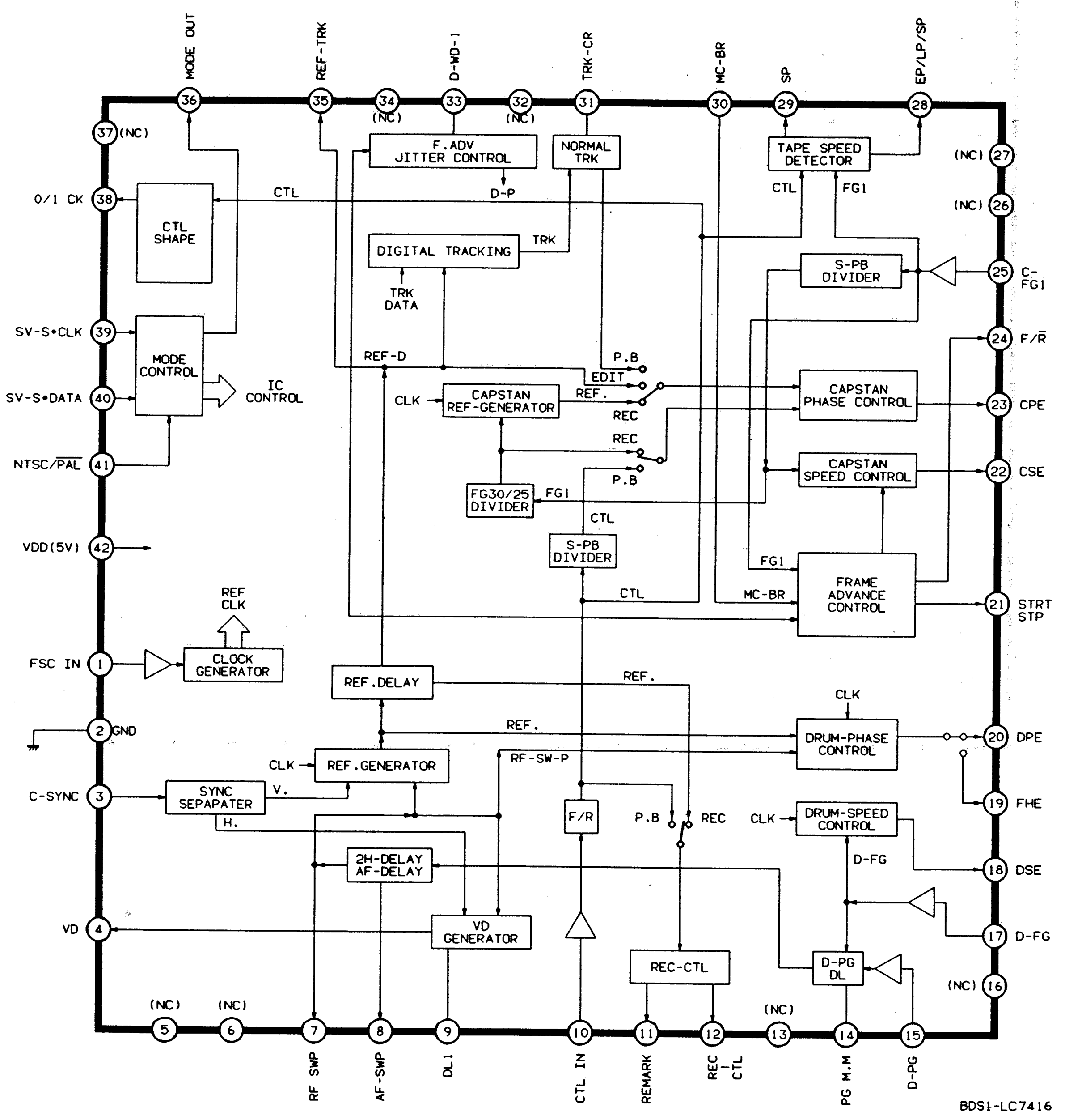


PAL/NAP SWITCH
Q3702 2SC536
Q3701 2SC536
R3706 1.8K
R3708 22K
R3701 22K
C3705 0.001
C3701 0.001
R3707 16K
R3709 33K
R3703 1K
R3702 33K
R3512 33K
R3710 33K
D3703 1SS133
D3701 1SS133
PAL 5V
NAP 5V
4.43 FSC
V.LOCK P.
C-SYNC
RF SW P.
TO VD-A
SWD 5V
MH 13V
MH GND
D3506 1SS133
D3505 1SS133
C3504 220P
NAP PG
VR371 220K
VR351 220K
PAL PG
C3506 0.022
C3508 0.0068
R3509 100K
R3510 100K
C3507 0.015
R3507 100K
R3508 330K
R3507 150K
R3506 10K
R3506 15K
C3510 22/16
C3509 0.015
C3511 22/16
IC351 LC7416-8093 SERVO M.P.U
Fsc
Vss
C-Sync
Vd-OUT
(NC)
RF SW P.
AF SW
DL1
CTL IN
REMARK
REC-CTL
DPG-MM
DPG
D FG
D SE
F HE
D PE
C-STRT/STP
Vdd
NTSC/PAL
SV-DATA
SV-CLK
INDEX
MODE-OUT
REF-TRK
BRK MM
TRK-CR
CAP-BRK
SP-OUT
EP/LP/SP
C FG1
F/R
C PE
C SE
C3502 47/6.3
C3503 0.1
R3505 22K
R3504 22K
R3543 39K
C3537 10/16
R3713 56K
C3518 22/16
C3517 22/16
R3517 27K
R3516 150K
R3515 330K
C3516 0.0068
R3503 270K
R3502 1.5K
C3501 0.012
R3714 2.2K
R3501 10K
R3514 33K
C3515 0.0056
R3513 33K
C3514 0.0056
MC 13V
MC GND
NAP 5V
T SPEED
RF SW P
4K PWM
SV CLK
SV DATA
C.FG.P.
MC BR
FF+REW
CTL P.
TO SY-A

FOR SLV-X1ME, SLV-X1, SLV-X1PS, SLV-X3ME, SLV-X3 AND SLV-X3PS
SLV-X3ME, SLV-X3 AND SLV-X3PS ONLY
SLV-X1ME, SLV-X1 AND SLV-X1PS ONLY

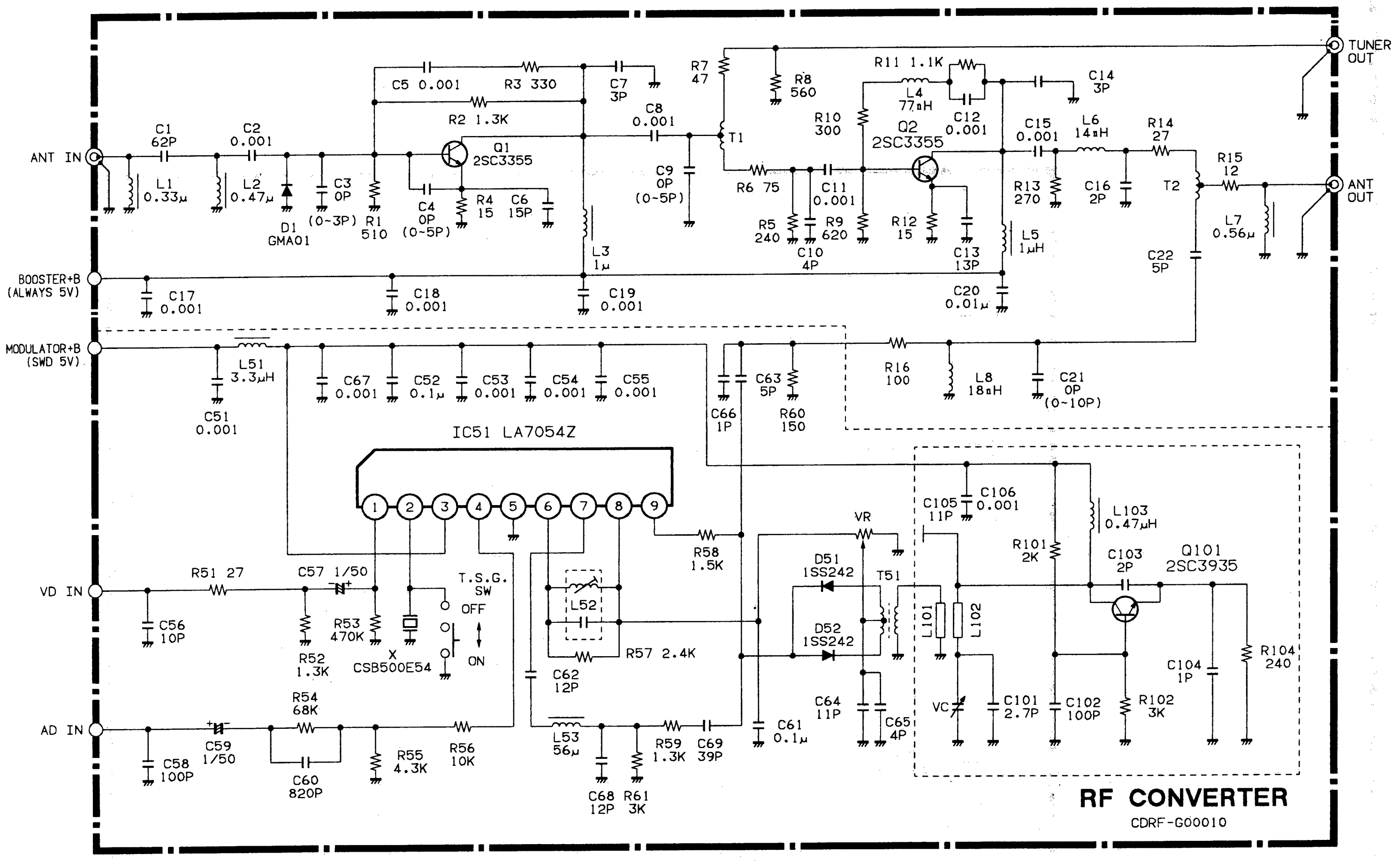
VOLTAGE *PLAY MODE*

IC351 (LC7416) DIGITAL SERVO IC INTER BLOCK DIAGRAM

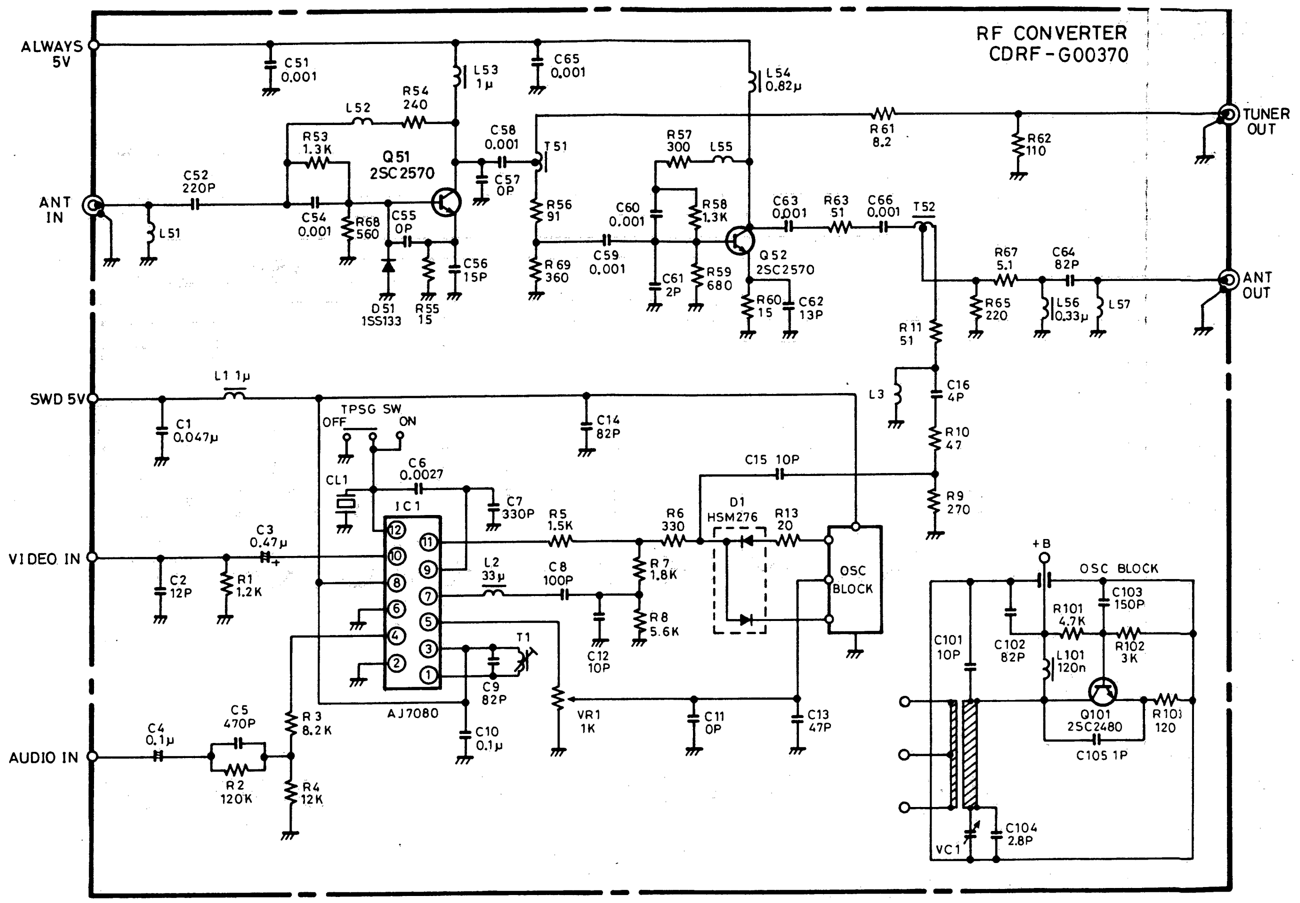


MODE OUT
REF-TRK
D-WD-1
TRK-CR
MC-BR
SP
EP/LP/SP
(NC)
F.ADV JITTER CONTROL
NORMAL TRK
TAPE SPEED DETECTOR
0/1 CK
CTL SHAPE
CTL
D-P
FG1
DIGITAL TRACKING
TRK
TRK DATA
S-PB DIVIDER
C-FG1
SV-S•CLK
MODE CONTROL
IC CONTROL
REF-D
P.B
EDIT
REF.
F/R
SV-S•DATA
CLK
CAPSTAN REF-GENERATOR
CAPSTAN PHASE CONTROL
CPE
REC
NTSC/PAL
CAPSTAN SPEED CONTROL
CSE
FG30/25 DIVIDER
VDD(5V)
FRAME ADVANCE CONTROL
STRT STP
REF CLK
FSC IN
CLOCK GENERATOR
REF.DELAY
GND
DRUM-PHASE CONTROL
DPE
REF.GENERATOR
RF-SW-P
C-SYNC
SYNC SEPAPATER
V.
H.
FHE
DRUM-SPEED CONTROL
D-FG
2H-DELAY AF-DELAY
DSE
VD
VD GENERATOR
REC-CTL
D-PG DL
RF SWP
AF-SWP
DL1
CTL IN
REMARK
REC CTL
PG M.M
D-PG
BDS1-LC7416

RF CONVERTER CIRCUIT DIAGRAM (SLV-X1ME, SLV-X3ME)

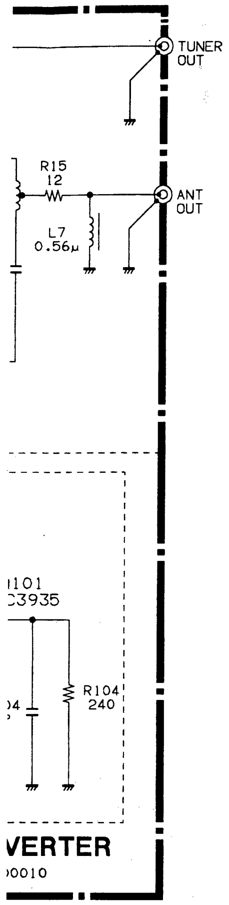

ANT IN
BOOSTER+B (ALWAYS 5V)
MODULATOR+B (SWD 5V)
VD IN
AD IN
TUNER OUT
ANT OUT
C1 62P
C2 0.001
L1 0.33μ
L2 0.47μ
D1 GMA01
C3 0P (0-3P)
R1 510
C4 0P (0-5P)
C5 0.001
R3 330
R2 1.3K
Q1 2SC3355
R4 15
C6 15P
C7 3P
C8 0.001
C9 0P (0-5P)
R7 47
T1
L3 1μ
R8 560
R10 300
R6 75
C11 0.001
R5 240
R9 620
C10 4P
R11 1.1K
L4 77nH
C12 0.001
Q2 2SC3355
R12 15
C13 13P
C14 3P
C15 0.001
L6 14nH
R14 27
R13 270
C16 2P
T2
R15 12
L5 1μH
L7 0.56μ
C22 5P
C17 0.001
C18 0.001
C19 0.001
C20 0.01μ
L51 3.3μH
C51 0.001
C67 0.001
C52 0.1μ
C53 0.001
C54 0.001
C55 0.001
C66 1P
C63 5P
R60 150
R16 100
L8 18nH
C21 0P (0-10P)
IC51 LA7054Z
R58 1.5K
R51 27
C57 1/50
C56 10P
R53 470K
R52 1.3K
X CSB500E54
T.S.G. SW OFF ON
L52
C62 12P
R57 2.4K
R54 68K
C58 100P
C59 1/50
C60 820P
R55 4.3K
R56 10K
L53 56μ
C68 12P
R61 3K
R59 1.3K
C69 39P
C61 0.1μ
VR
D51 1SS242
T51
D52 1SS242
C64 11P
C65 4P
L101
L102
VC
C101 2.7P
C105 11P
C106 0.001
R101 2K
L103 0.47μH
C103 2P
Q101 2SC3935
C102 100P
R102 3K
C104 1P
R104 240
RF CONVERTER
CDRF-G00010

RF CONVERTER CIRCUIT DIAGRAM (SLV-X1ME, SLV-X3ME)

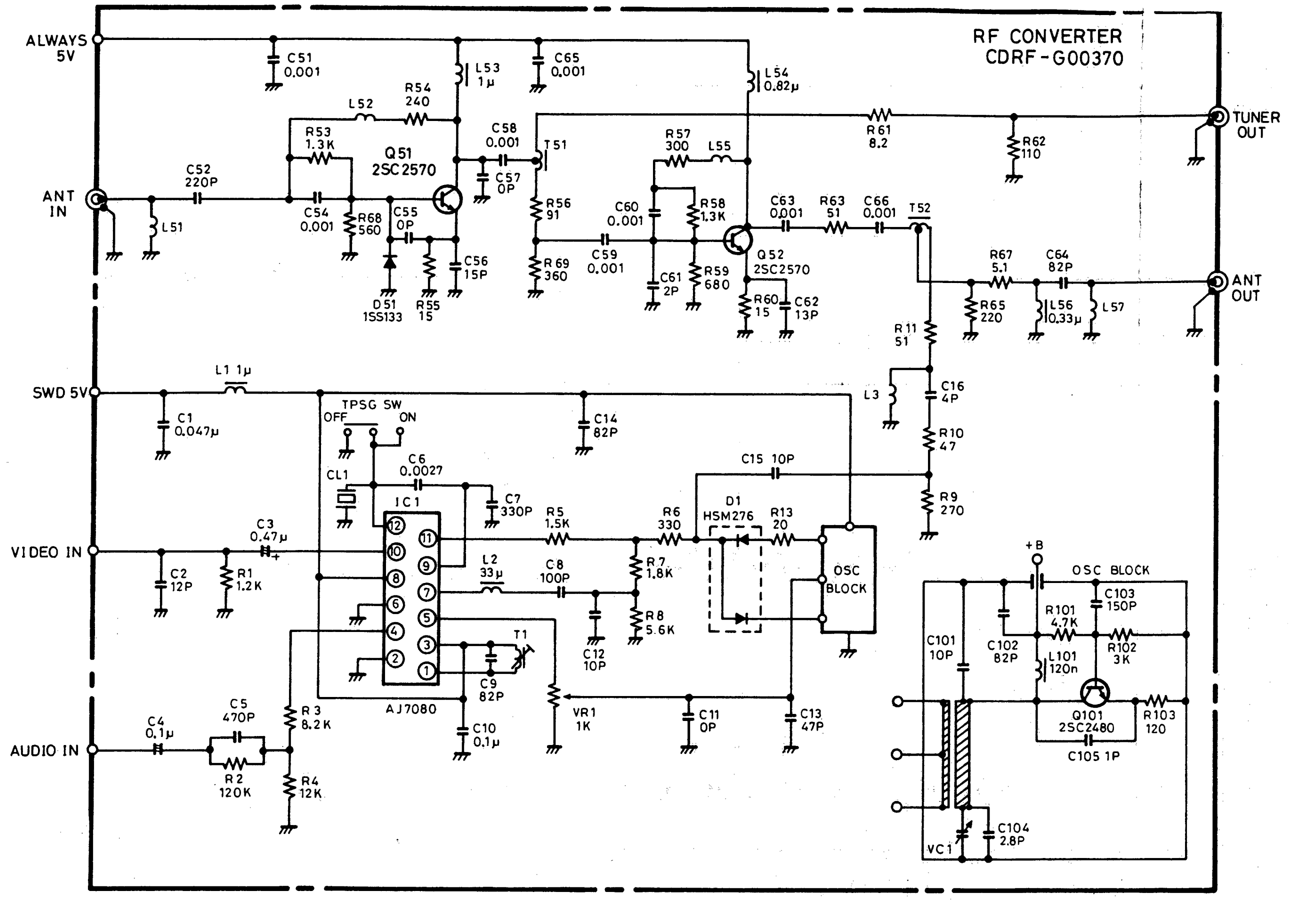

RF CONVERTER
CDRF-G00370
ALWAYS 5V
ANT IN
SWD 5V
VIDEO IN
AUDIO IN
TUNER OUT
ANT OUT
C51 0.001
L53 1μ
C65 0.001
L54 0.82μ
R54 240
L52
R53 1.3K
Q51 2SC2570
C52 220P
L51
C54 0.001
R68 560
C55 0P
D51 1SS133
R55 15
C56 15P
C57 0P
C58 0.001
T51
R56 91
R69 360
C59 0.001
C60 0.001
R57 300
L55
R58 1.3K
C61 2P
R59 680
Q52 2SC2570
R60 15
C62 13P
C63 0.001
R63 51
C66 0.001
T52
R61 8.2
R62 110
R67 5.1
C64 82P
R65 220
L56 0.33μ
L57
R11 51
L3
C16 4P
R10 47
R9 270
L1 1μ
C1 0.047μ
TPSG SW OFF ON
C14 82P
CL1
C6 0.0027
IC1
AJ7080
C7 330P
R5 1.5K
R6 330
D1 HSM276
R13 20
C15 10P
OSC BLOCK
C3 0.47μ
C2 12P
R1 1.2K
L2 33μ
C8 100P
R7 1.8K
R8 5.6K
C12 10P
T1
C9 82P
C10 0.1μ
VR1 1K
C11 0P
C13 47P
C4 0.1μ
C5 470P
R2 120K
R3 8.2K
R4 12K
+B
OSC BLOCK
C101 10P
C102 82P
R101 4.7K
C103 150P
L101 120n
R102 3K
Q101 2SC2480
R103 120
C105 1P
C104 2.8P
VC1

J
I
H
G
F
E
D
C
B
A

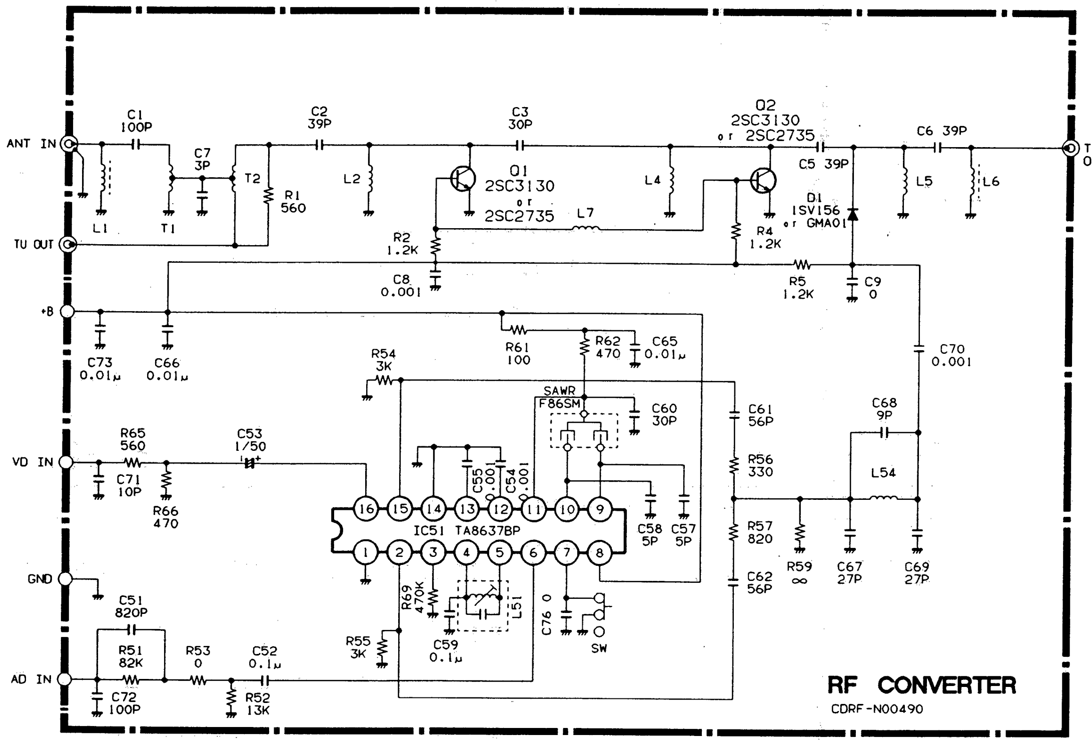
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16


TUNER OUT
R15 12
ANT OUT
L7 0.56μ
1101
3935
R104 240
VERTER
0010

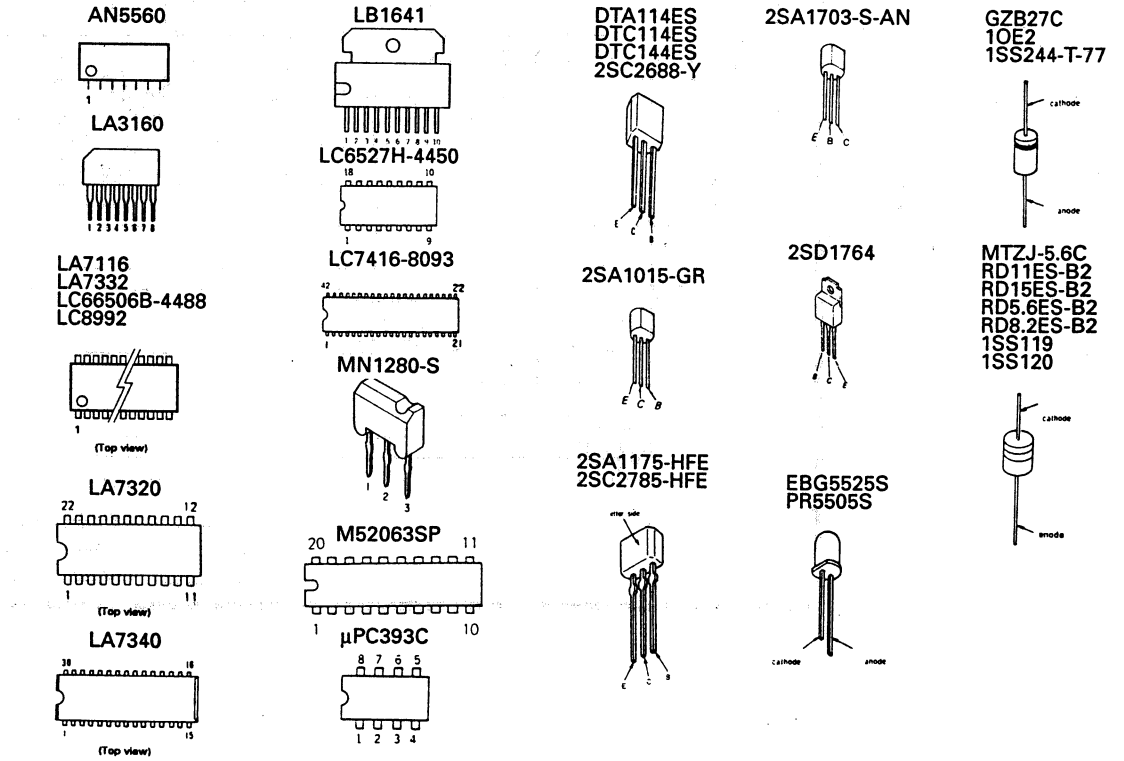
RF CONVERTER CIRCUIT DIAGRAM (SLV-X1ME, SLV-X3ME)


RF CONVERTER
CDRF-G00370
ALWAYS 5V
ANT IN
SWD 5V
VIDEO IN
AUDIO IN
TUNER OUT
ANT OUT
C51 0.001
C65 0.001
L53 1μ
L54 0.82μ
R54 240
L52
R53 1.3K
Q51 2SC2570
C52 220P
L51
C54 0.001
R68 560
C55 0P
D51 1SS133
R55 15
C56 15P
C57 0P
C58 0.001
T51
R56 91
R69 360
C59 0.001
C60 0.001
R57 300
L55
R58 1.3K
C61 2P
R59 680
Q52 2SC2570
R60 15
C62 13P
C63 0.001
R63 51
C66 0.001
T52
R61 8.2
R62 110
R67 5.1
C64 82P
R65 220
L56 0.33μ
L57
R11 51
L3
C16 4P
R10 47
R9 270
L1 1μ
C1 0.047μ
TPSG SW
OFF
ON
C14 82P
CL1
C6 0.0027
C7 330P
IC1
C15 10P
D1 HSM276
R13 20
OSC BLOCK
C3 0.47μ
C2 12P
R1 1.2K
R5 1.5K
R6 330
R7 1.8K
R8 5.6K
L2 33μ
C8 100P
C12 10P
T1
C9 82P
C10 0.1μ
VR1 1K
C11 0P
C13 47P
AJ7080
C4 0.1μ
C5 470P
R2 120K
R3 8.2K
R4 12K
+B
OSC BLOCK
C101 10P
C102 82P
R101 4.7K
C103 150P
L101 120n
R102 3K
Q101 2SC2480
R103 120
C105 1P
C104 2.8P
VC1

RF CONVERTER CIRCUIT DIAGRAM (SLV-X1PS, SLV-X3PS, SLV-X1, SLV-X3)


ANT IN
TU OUT
+B
VD IN
GND
AD IN
TV OUT
C1 100P
C7 3P
L1
T1
T2
C2 39P
R1 560
L2
C3 30P
Q1 2SC3130 or 2SC2735
L7
R2 1.2K
C8 0.001
L4
Q2 2SC3130 or 2SC2735
C5 39P
C6 39P
L5
L6
D1 1SV156 or GMA01
R4 1.2K
R5 1.2K
C9 0
C73 0.01μ
C66 0.01μ
R54 3K
R61 100
R62 470
C65 0.01μ
C70 0.001
SAWR F86SM
C60 30P
C61 56P
C68 9P
R65 560
C71 10P
R66 470
C53 1/50
R56 330
L54
IC51 TA8637BP
C58 5P
C57 5P
R57 820
R59 ∞
C67 27P
C69 27P
C62 56P
C51 820P
R51 82K
R53 0
C52 0.1μ
C72 100P
R52 13K
R55 3K
R69 470K
C59 0.1μ
L51
C76 0
SW
RF CONVERTER
CDRF-N00490

SEMICONDUCTORS


AN5560
LA3160
LA7116
LA7332
LC66506B-4488
LC8992
(Top view)
LA7320
(Top view)
LA7340
(Top view)
LB1641
LC6527H-4450
LC7416-8093
MN1280-S
M52063SP
μPC393C
DTA114ES
DTC114ES
DTC144ES
2SC2688-Y
2SA1015-GR
2SA1175-HFE
2SC2785-HFE
2SA1703-S-AN
2SD1764
EBG5525S
PR5505S
GZB27C
10E2
1SS244-T-77
cathode
anode
MTZJ-5.6C
RD11ES-B2
RD15ES-B2
RD5.6ES-B2
RD8.2ES-B2
1SS119
1SS120
E C B
E B C
B C E

SECTION 5

MECHANISM ADJUSTMENTS

1. OUTLINE OF MECHANISM

This mechanism is named P-90 Mechanism. Its features include :

(1) The chassis is fabricated by drawing a 1.6mm thick electric zinc plated steel sheet, and mechanical parts are ingeniously laid on this chassis. The mechanism is as thick as 70.3 mm.

(2) After insertion of a cassette, the tape is normally wound to the head drum based on the full loading system. This design results in the shortening of the mode shift time, that is, the time from the depression of the PLAY pushbutton switch to the video image display on screen has been significantly quickened.

(3) The full loading system employed has the F/R search capability (when the same button (F.FWD or REW) is pressed in the F.FWD or REW modes, the search mode playback image appears on the screen).

(4) Also, a thin type head drum without lead is provided to increase the operating convenience of the equipment to a considerable extent.

(5) The drive source for cassette loading and the motor for the tape loading mode selection are used in combination with the head motor and the capstan motor for realization of a 3-motor system.

1-1. FULL LOADING MECHANISM

(1) Description of full loading mechanism
As shown in Fig. 1-1 a tape has hitherto been wound onto the head drum only in the PLAY and F/R SEARCH mode, but in this radically new mechanism, in every mode can be made with the tape kept wound onto the head drum.

(2) Features of full loading mechanism
With the provision of the full loading mechanism, the operating convenience, which was hitherto a drawback of the VHS system, has been improved. A host of other salient features are also designed into this mechanism as apparent from the following description.

I. Quick playback
Mode shift time such as the STOP→PLAY and FF/REW→PLAY has been shortened for quicker playback.

II. High-speed VISS
The time from the detection of VISS search signal based on the VHS standardized search system till image display on the screen has considerably been shortened to make high-speed VISS possible.

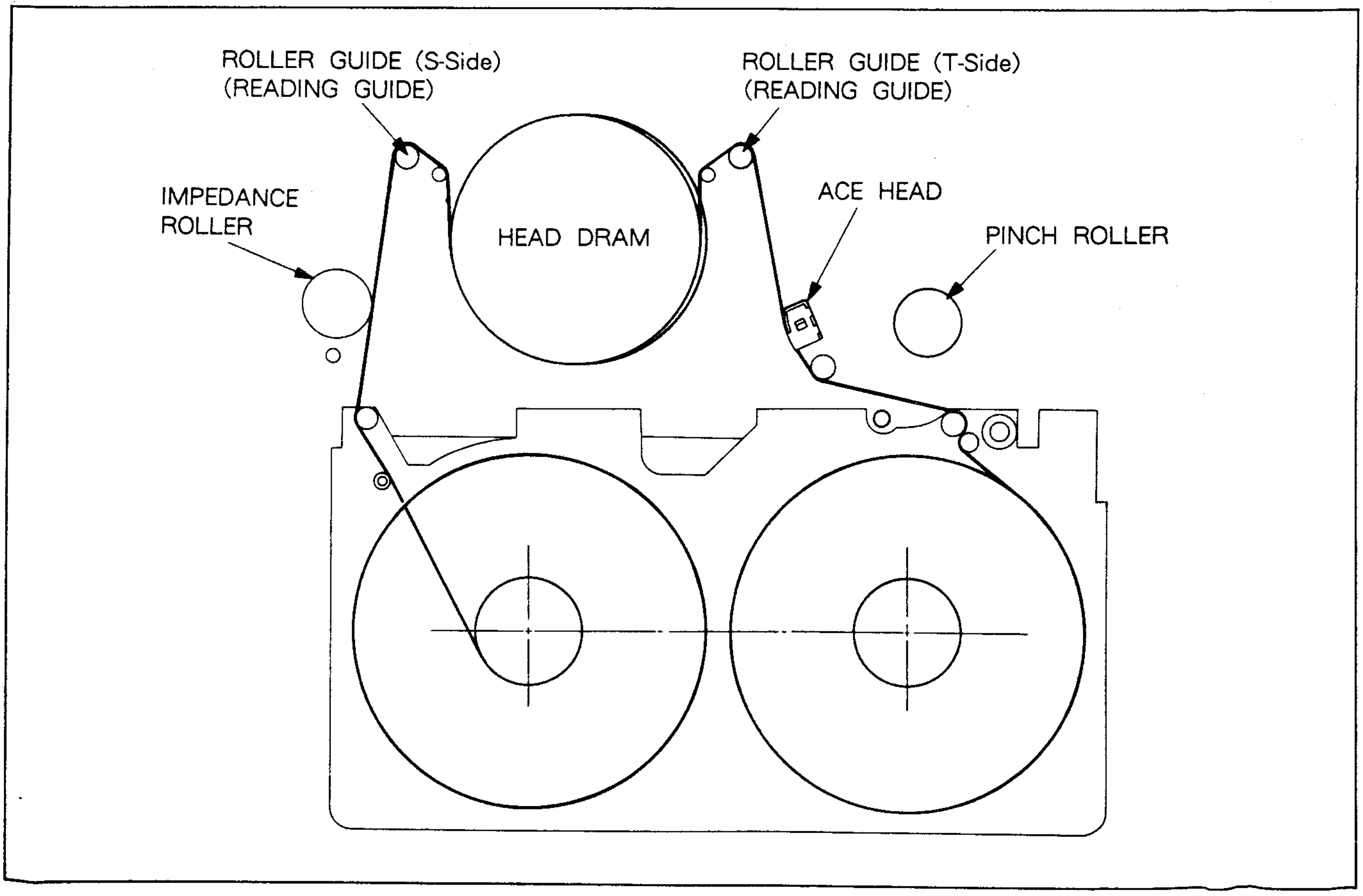


Fig. 1-1 FULL LOADING SYSTEM (AT FF/REW MODE)

III. F/R search
FF↔F-SEARCH and REW↔R-SEARCH can be made direct by reducing the mode transition time.

(3) Protection mechanism for full loading system

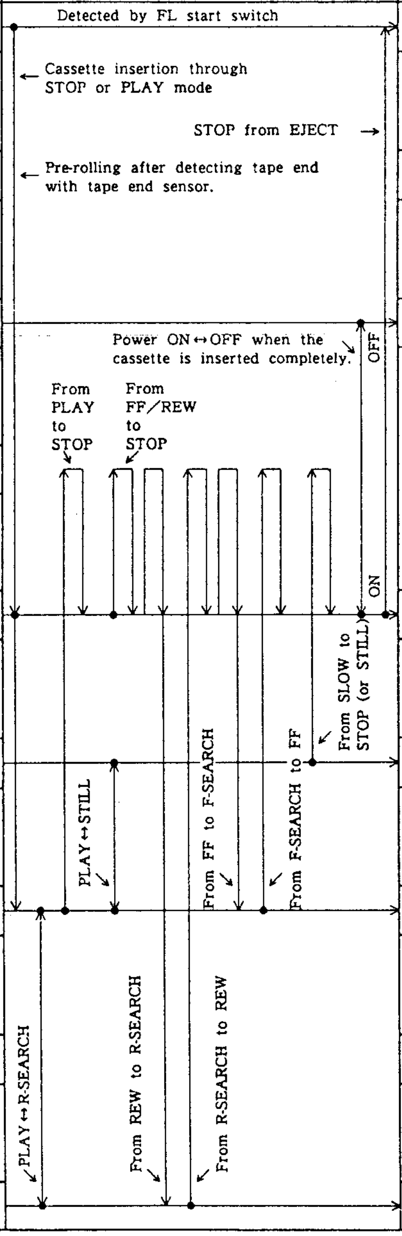
I. Video Tape Protection Mechanism
(a) FF/REW→STOP
Tape tension applied to the head drum when stopping is lowered by optimizing the balance between the left and right, and brake forces acting on the left and right reel table. Thereby it prevents from causing a scratch on the tape due to V-head when stopping.
(b) STOP→FF/REW
The starting-up speed of the capstan motor is ingeniously designed to preclude the possibility of unusual tape tension at the time of REW/FWD start-up.
(c) Tape end brake damping
The design of the mechanism is so made that the time from issuance of an electrical STOP command till actual brake application is reduced to a minimum. This enable the braking to be completed before the reader tape end.
(d) FF/REW running
To ensure highly stable tape running in any condition and any environment, design consideration is given to the foundation brake torque (soft brake) to the reel table and the tape winding angle with respect to each tape guide. Particularly in regard to the supply side fixing guide and F.T.E (Full Track Erase) head, the design is so made that they do not come into contact with the tape at the time of FF/REW operation to alleviate load application.

II. Final End Position Tape Loading Protection Mechanism
Tape pull-out (loading) from within the cassette is done to ensure proper take-up of the tape onto the head drum. At that time, the tape is extended from the supply reel side.
So, if the tape is wound to the final end, no loading can be made. For this reason, a mode is designed to allow the tape to be rewound a little at the final end of the tape without any loading done.

2. DESCRIPTION OF MECHANISM OPERATION

2-1. BASIC OPERATION MODE OF MECHANISM

The P-90 mechanism has its original modes such as given in Table 2-1, in addition to the VTR is operation modes (STOP, FF, REW, PLAY, R-SEARCH, F-SEARCH, STILL, SLOW, and ETS). These modes specific to the mechanism play important roles in tape protection operation at the time of a shift to various modes of the VTR above. A shift to the mode specific to the mechanism is carried out by controlling the rotation of the loading motor with the control signal of the system control circuit. The detection of important mechanism operation mode positions is done by using the FL START SWITCH for detecting the cassette ejection/insertion, and the MECHANISM MODE SWITCH for detecting each mode of the mechanism (3 bit MODE DATA is output by operating the rotary switch).

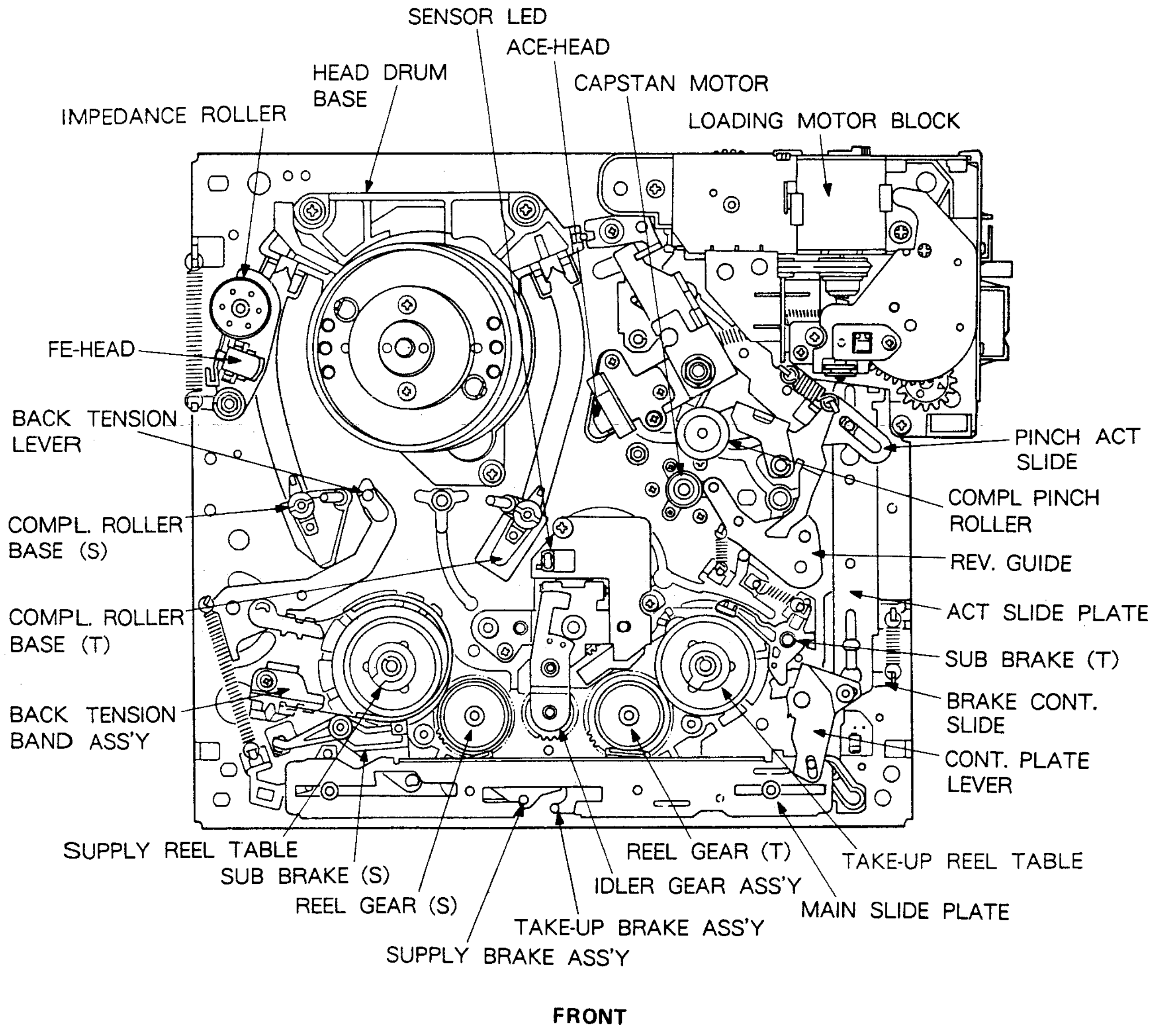
Mechanism Mode	Mechanism Mode Switch			HEX DATA	Function	Main Mode Shifting Conditions	VTR Operation Mode
	3	2	1				
EJECT	–	–	–		Eject position		EJECT
					Front loading/Unloading		
SHORT REW	–	–	–		Take up operation in the tape end position		Low side of ⑥. Sensed upon IN
INITIAL	1	1	1	⑦	Power off position		Power off when tape is loaded completely
					Tape unloading position Tape loading Tape loading ending position		
BRAKE	0	0	1	①	Main brake applying position		
STOP / FF/REW	0	1	0	②	STOP waiting and FF/REW (the head motor rotation)		STOP, FF/REW
STILL	0	1	1	③	The positions of STILL, SLOW or F-ADV.		STILL, SLOW, F-ADV
PLAY	1	0	0	④	From FWD direction Normal running mode		PLAY, F-SEARCH
IDLER	1	0	1	⑤	Forward/reverse changeover position		PAUSE
REV	1	1	0	⑥	From REV direction Normal running mode		R-SEARCH

Detected by FL start switch
Cassette insertion through STOP or PLAY mode
STOP from EJECT
Pre-rolling after detecting tape end with tape end sensor.
Power ON↔OFF when the cassette is inserted completely.
OFF
ON
From PLAY to STOP
From FF/REW to STOP
From SLOW to STOP (or STILL)
From FF to F-SEARCH
From F-SEARCH to FF
PLAY↔STILL
PLAY↔R-SEARCH
From REW to R-SEARCH
From R-SEARCH to REW

Table 2-1

2-2. DESCRIPTION OF MECHANISM DRIVE

To realize the thin type mechanism, a loading motor and two pieces of cam (MAIN CAM GEAR and the MODE CAM GEAR) to be driven by the said motor are mounted on the upper part of the capstan motor, that was a dead space in the conventional mechanisms hitherto available with a view to optimization of parts mounting layout. (Fig. 2-1 and Fig. 2-2.)



SENSOR LED
ACE-HEAD
HEAD DRUM BASE
CAPSTAN MOTOR
IMPEDANCE ROLLER
LOADING MOTOR BLOCK
FE-HEAD
BACK TENSION LEVER
PINCH ACT SLIDE
COMPL. ROLLER BASE (S)
COMPL PINCH ROLLER
REV. GUIDE
COMPL. ROLLER BASE (T)
ACT SLIDE PLATE
SUB BRAKE (T)
BACK TENSION BAND ASS'Y
BRAKE CONT. SLIDE
CONT. PLATE LEVER
SUPPLY REEL TABLE
SUB BRAKE (S)
REEL GEAR (S)
REEL GEAR (T)
IDLER GEAR ASS'Y
TAKE-UP REEL TABLE
MAIN SLIDE PLATE
TAKE-UP BRAKE ASS'Y
SUPPLY BRAKE ASS'Y
FRONT

Fig. 2-1 TOP VIEW OF MECHANISM (INITIAL MODE)

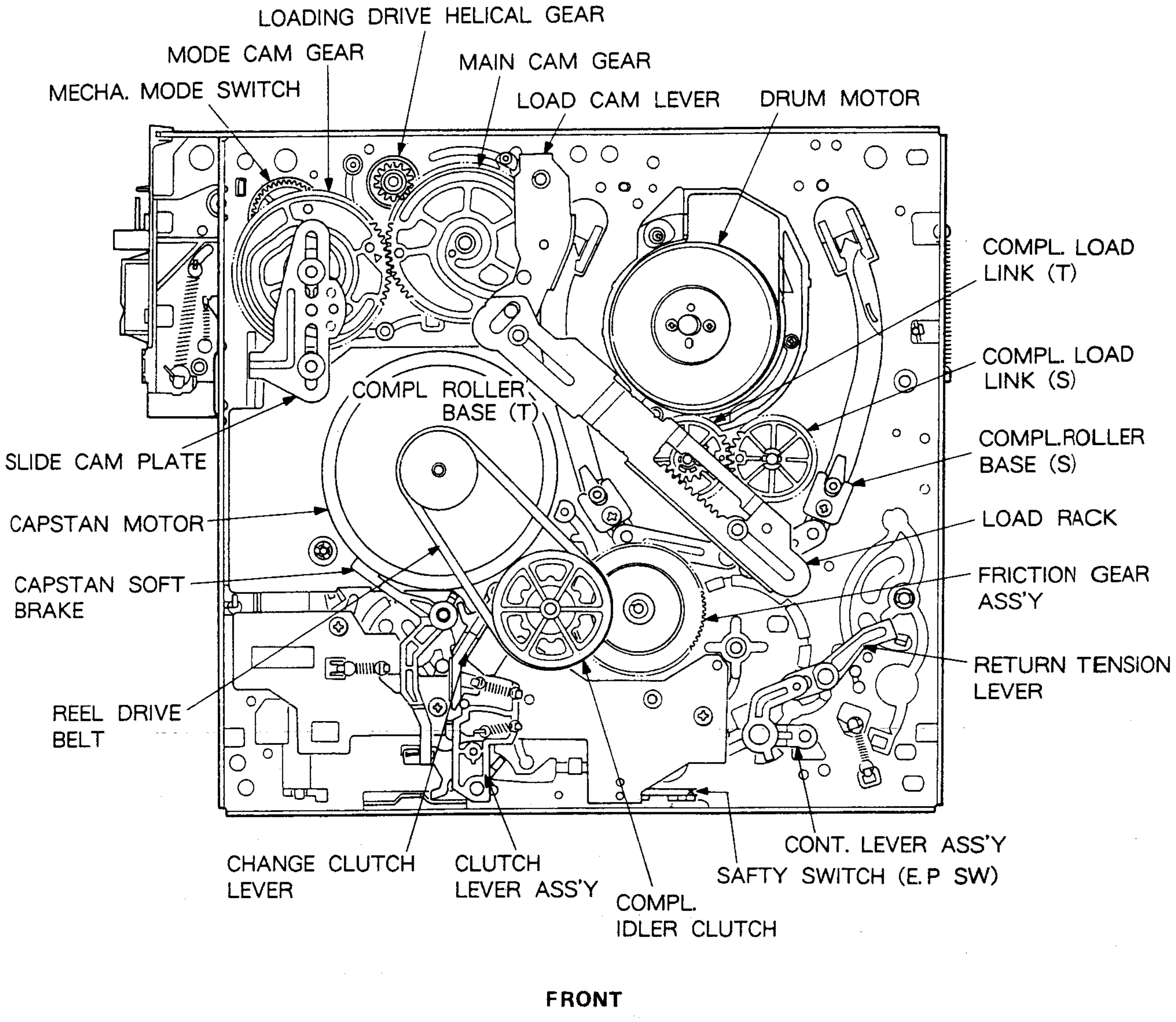

LOADING DRIVE HELICAL GEAR
MODE CAM GEAR
MAIN CAM GEAR
MECHA. MODE SWITCH
LOAD CAM LEVER
DRUM MOTOR
COMPL. LOAD LINK (T)
COMPL. LOAD LINK (S)
COMPL ROLLER BASE (T)
COMPL.ROLLER BASE (S)
SLIDE CAM PLATE
CAPSTAN MOTOR
LOAD RACK
CAPSTAN SOFT BRAKE
FRICTION GEAR ASS'Y
RETURN TENSION LEVER
REEL DRIVE BELT
CONT. LEVER ASS'Y
CHANGE CLUTCH LEVER
CLUTCH LEVER ASS'Y
SAFTY SWITCH (E.P SW)
COMPL. IDLER CLUTCH
FRONT

Fig. 2-2 BOTTOM VIEW OF MECHANISM (INITIAL MODE)

These two cams have one CAM GROOVE on both sides. A total of four CAM GROOVEs performs independent functions to meet the multi-function needs of these days by driving the elements of a wide variety of functions with the motor precisely controlled by a microcomputer.

The two cams are positive motion cams having a groove over 570 degrees. These cams cause the amount of lift to be changed by a mild gradient according to the angle of rotation while synchronizedly being rotated by an outer circumferential gear to alleviate the load exerted on the cams when driving the rod linked with the cams and also to ensure position stability in each mode of operation. The geometry of each cam and that of a metal fitting of the drive section are shown in Fig. 2-3 and Fig. 2-4, respectively. Also, the role of each cam used is described below.

On the GROOVE 3 side of MODE CAM GEAR have a small gear. This small gear is engaged with the MECHANISM MODE SWITCH as shown in Fig. 2-3., and detect the mechanism operation mode. In this way, the two cams and the MECHANISM MODE SWITCH are rotated synchronously, and the mechanism is fully synchronized and driven for each mode.

MAIN CAM GEAR :	CAM GROOVE 1. Pinch roller pressing operation CAM GROOVE 2. Tape loading mechanical drive
MODE CAM GEAR :	CAM GROOVE 3. Brake and clutch selecting operation CAM GROOVE 4. Brake control and front unloading control

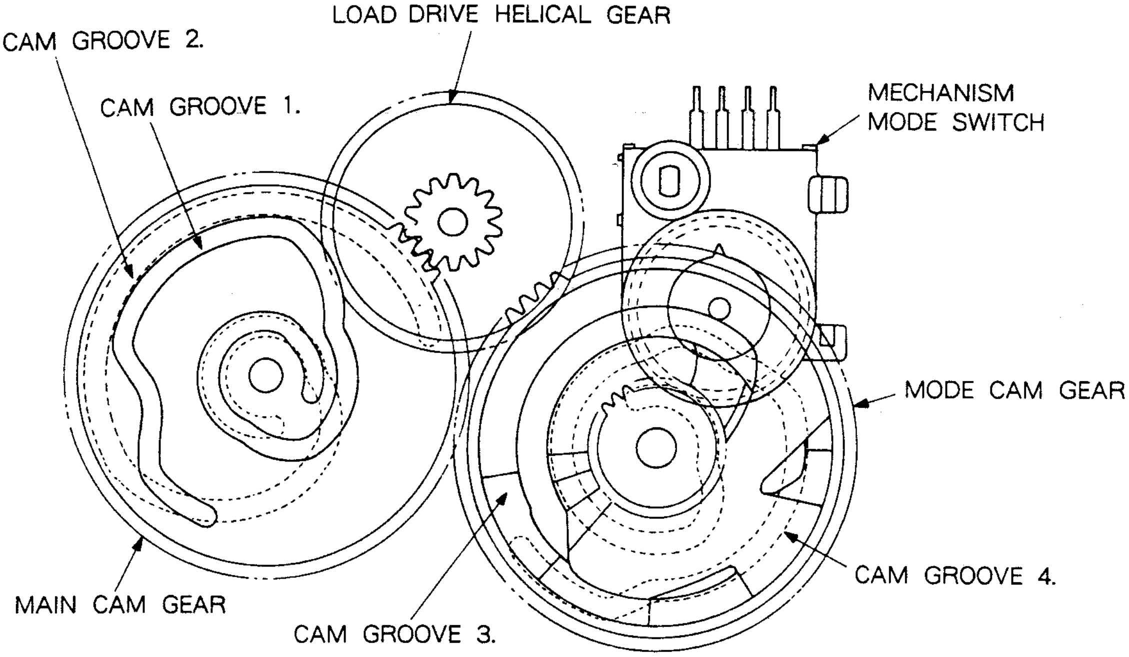


Fig. 2-3 PLAN OF CAMS CONSTRUCTION

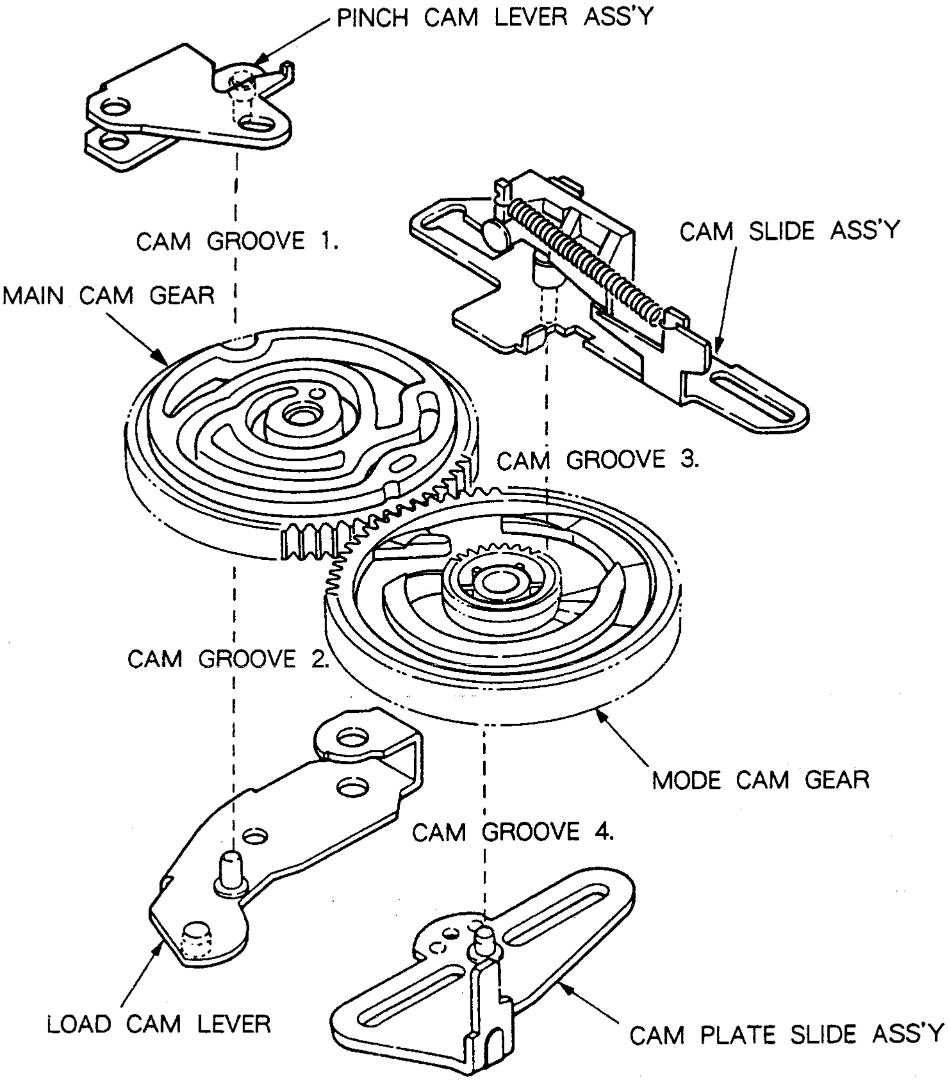
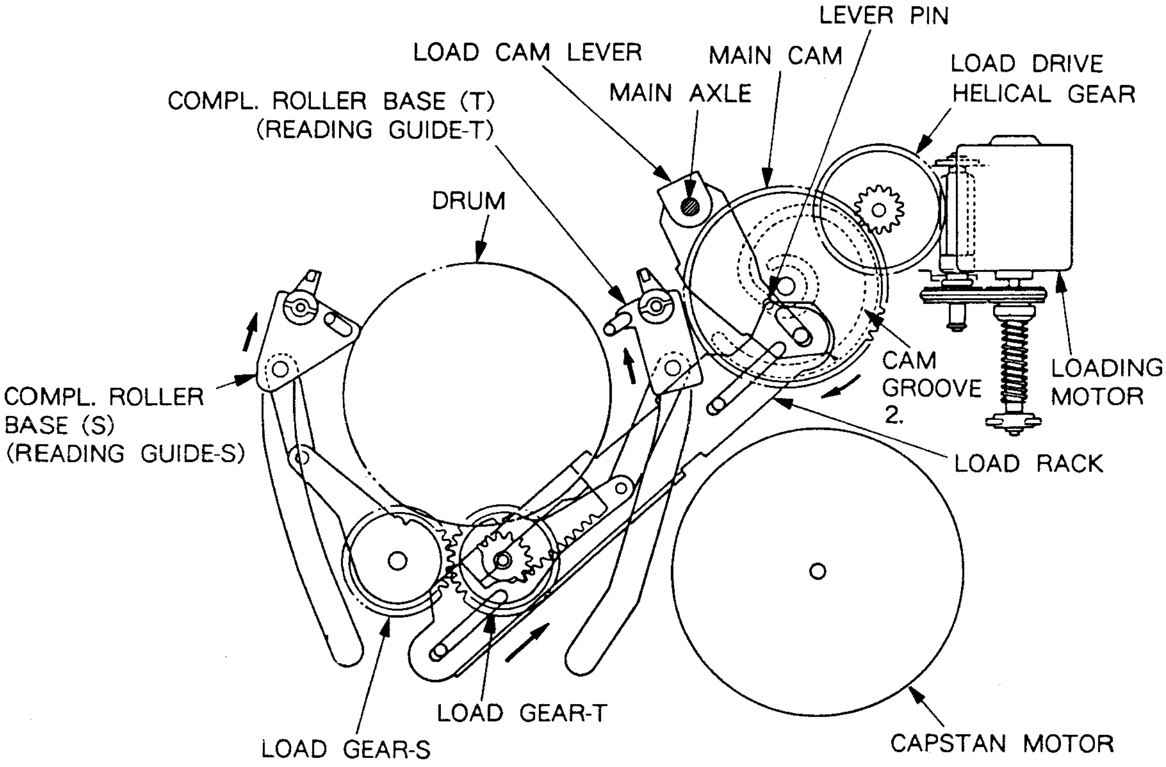

PINCH CAM LEVER ASS'Y
CAM SLIDE ASS'Y
CAM GROOVE 1.
MAIN CAM GEAR
CAM GROOVE 3.
CAM GROOVE 2.
MODE CAM GEAR
CAM GROOVE 4.
LOAD CAM LEVER
CAM PLATE SLIDE ASS'Y

Fig. 2-4 VIEW OF CAMS CONSTRUCTION

2-2-1. Tape Loading Mechanism

The tape loading mechanism is compactly designed with use of a LOAD RACK for loading by drive from the before-mentioned MAIN CAMs with CAM GROOVE 2. The LOAD RACK is laid on the dead space in between the DD capstan motor and the head motor for effective space utilization. (Fig. 2-5) The process from tape pull-out upon loading to contact of the leading guide section with the stopper of drum base and press-fitting under tension of spring is guided and driven in such a manner that the rod is drawn inward from the outer circumferential direction of the CAM GROOVE 2, thereby reducing the load torque (PV value) to the CAM GROOVE. And, the load of the loading motor is minimized to enhance reliability.



LEVER PIN
LOAD CAM LEVER
MAIN CAM
LOAD DRIVE HELICAL GEAR
COMPL. ROLLER BASE (T) (READING GUIDE-T)
MAIN AXLE
DRUM
COMPL. ROLLER BASE (S) (READING GUIDE-S)
CAM GROOVE 2.
LOADING MOTOR
LOAD RACK
LOAD GEAR-T
LOAD GEAR-S
CAPSTAN MOTOR

Fig. 2-5 CONSTRUCTION OF TAPE LOADING MECHANISM

2-2-2. Pinch Roller Pressing Mechanism

The PINCH LEVER assembly of the pinch roller is operated by the PINCH CAM LEVER (rod) driven by the CAM GROOVE 1 of the before-mentioned MAIN CAM, and then press-fitted to the capstan. The revolving tape guide (REV.GUIDE) is interlockingly operated with the PINCH LEVER assembly to ensure stable tape running at a fixed speed. (Fig. 2-6)

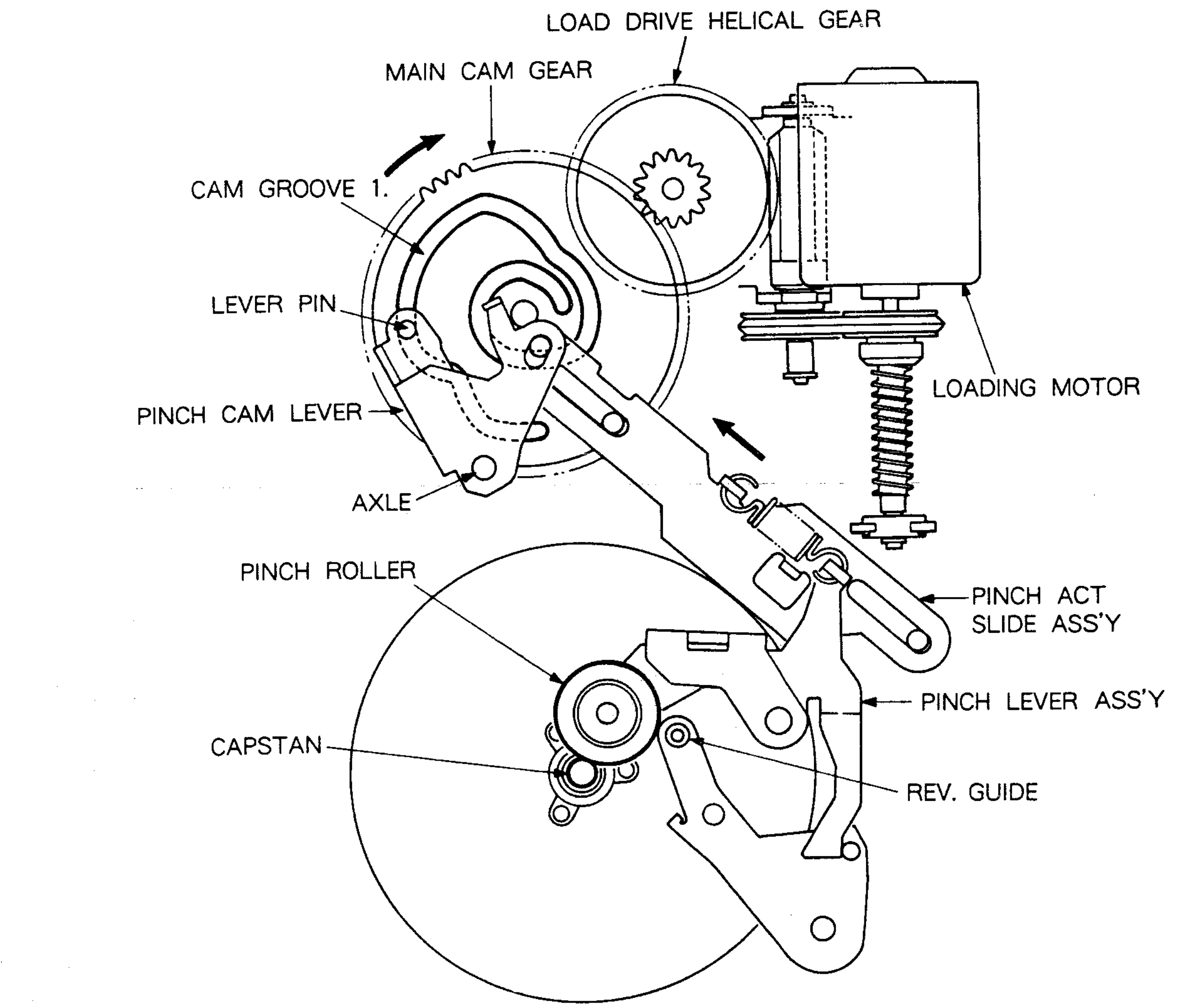

LOAD DRIVE HELICAL GEAR
MAIN CAM GEAR
CAM GROOVE 1.
LEVER PIN
PINCH CAM LEVER
AXLE
LOADING MOTOR
PINCH ROLLER
PINCH ACT SLIDE ASS'Y
PINCH LEVER ASS'Y
CAPSTAN
REV. GUIDE

Fig. 2-6 CONSTRUCTION OF PINCH ROLLER MECHANISM

2-2-3. Operation of Brake Control Plate

The ACT SLIDE PLATE and the MAIN SLIDE PLATE shown in Fig. 2-7 is driven by the CAM GROOVE 4 of the MODE CAM GEAR for precise control of operations including the control of back tension lever, auxiliary brake (SUB BRAKE S/T), main brake (SUPPLY BRAKE and TAKE-UP BRAKE), clutch selection, and drive selection of front loading mechanism.

Also, the mechanism mode switch is engaged with the small gear of the MODE CAM GEAR for sync rotation. At the time, the detection position of each mode is set so that it becomes the flat section at the cam curve of the CAM GROOVE 4 of the MODE CAM GEAR. So, even if motor stop time deviation occurs due to the load following the detection of the loading motor stop position, the control plate linked with a stop in the specified position.

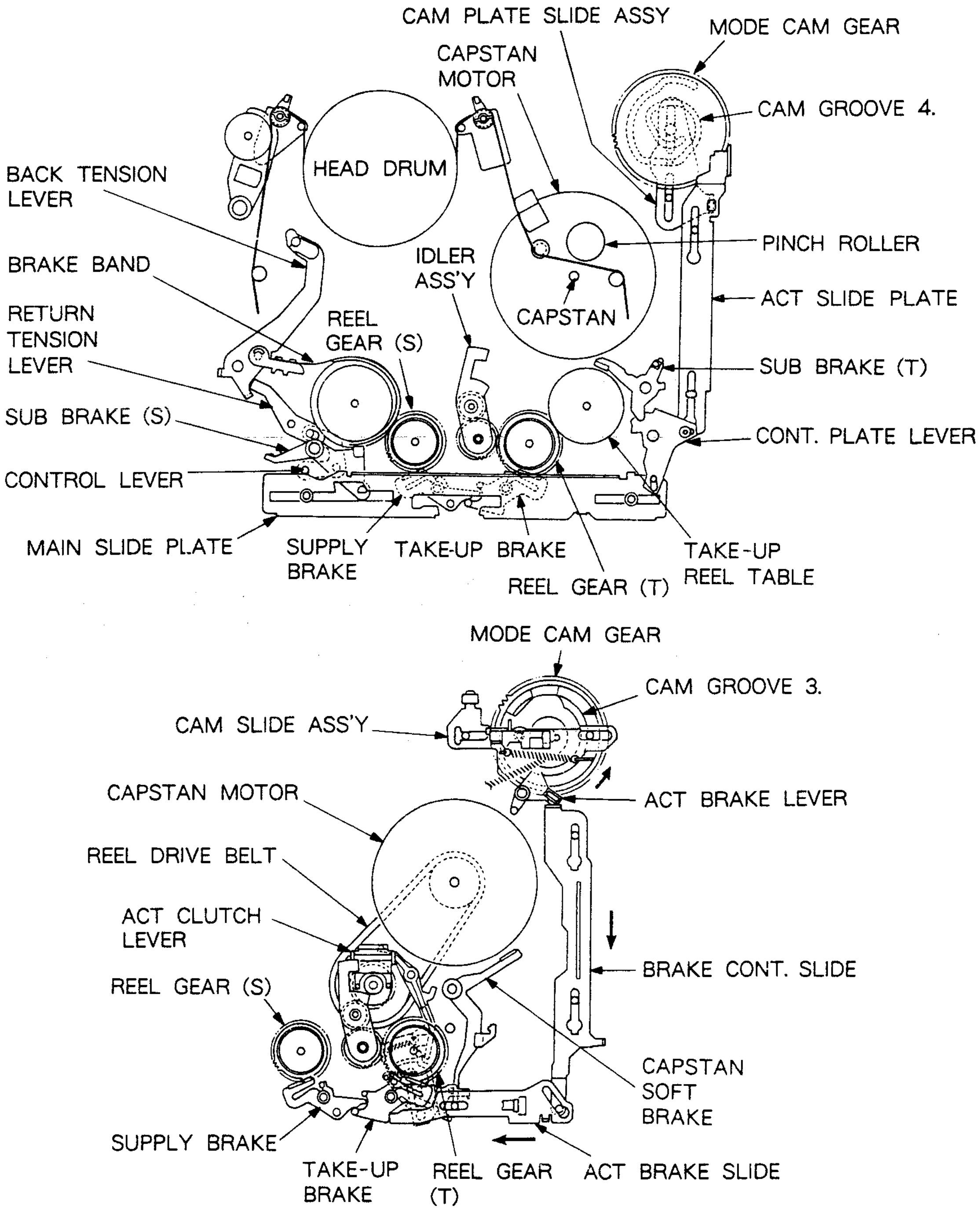

CAM PLATE SLIDE ASSY
MODE CAM GEAR
CAPSTAN MOTOR
CAM GROOVE 4.
BACK TENSION LEVER
HEAD DRUM
PINCH ROLLER
BRAKE BAND
IDLER ASS'Y
ACT SLIDE PLATE
RETURN TENSION LEVER
REEL GEAR (S)
CAPSTAN
SUB BRAKE (T)
SUB BRAKE (S)
CONT. PLATE LEVER
CONTROL LEVER
MAIN SLIDE PLATE
SUPPLY BRAKE
TAKE-UP BRAKE
REEL GEAR (T)
TAKE-UP REEL TABLE
MODE CAM GEAR
CAM GROOVE 3.
CAM SLIDE ASS'Y
CAPSTAN MOTOR
ACT BRAKE LEVER
REEL DRIVE BELT
ACT CLUTCH LEVER
BRAKE CONT. SLIDE
REEL GEAR (S)
CAPSTAN SOFT BRAKE
SUPPLY BRAKE
TAKE-UP BRAKE
REEL GEAR (T)
ACT BRAKE SLIDE

Fig. 2-7 CONSTRUCTION OF BRAKE CONTROL PLATE (AT REW/FF, STOP MODE)

2-2-4. Brake Control Mechanism

The mechanical logic of the brake state is shown in Fig. 2-8. The brake which damps the reel rotation is operated by the BRAKE CONTROL SLIDE driven from the CAM GROOVE 3 of the MODE CAM GEAR.

Also, to alleviate damage to the tape caused by high tension of the brake in operation, the tape is stopped after brake operation and the shape is thoughtfully designed for proper biting-in ratio of the left and the right brakes after-mentioned to each other.
This enables the supply brake to be released by the operation of the above-mentioned MAIN SLIDE PLATE after an elapse of prefixed slight time to reduce the tape tension to zero, and to provide the tape with a proper degree of looseness. As a result, a slight gap is created in the tape from the HEAD DRUM.

Further, a momentary still mechanism which dispenses with use of a plunger solenoid is not provided as one of design features of the P-90 mechanism.
To stabilize the image in an extremely short period of time during a shift to the STILL mode from the PLAY mode, the auxiliary brake (CAPSTAN SOFT BRAKE) is press-fit to the outer circumference of the capstan motor by the before-mentioned CAM GROOVE 3 of the MODE CAM GEAR.
These operations is interlocked with the operation of the before-mentioned ACT SLIDE PLATE and the MAIN SLIDE PLATE. It consists of one MODE CAM for offsetting the operating position.

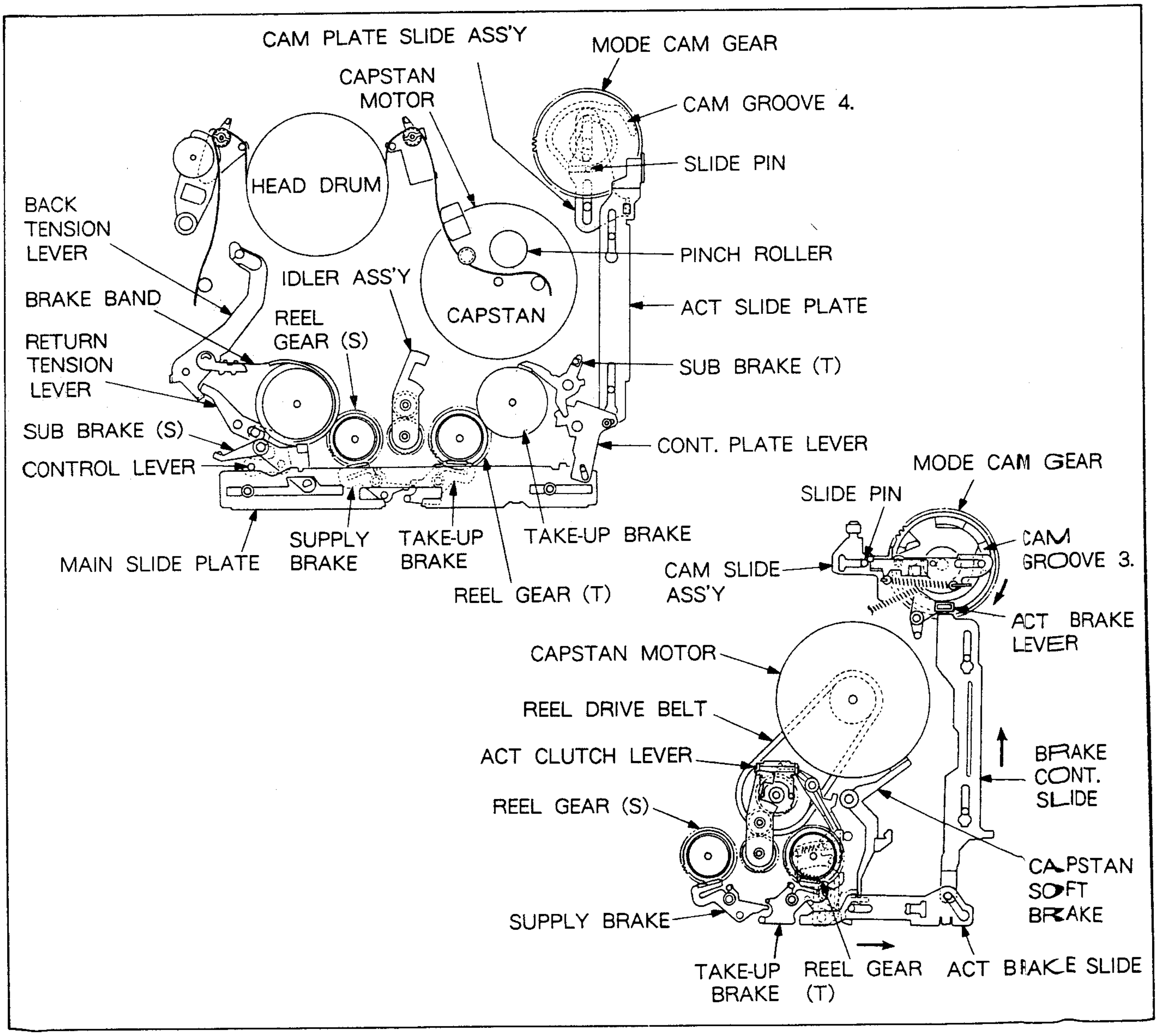

CAM PLATE SLIDE ASS'Y
MODE CAM GEAR
CAPSTAN MOTOR
CAM GROOVE 4.
SLIDE PIN
HEAD DRUM
BACK TENSION LEVER
PINCH ROLLER
IDLER ASS'Y
BRAKE BAND
CAPSTAN
ACT SLIDE PLATE
REEL GEAR (S)
RETURN TENSION LEVER
SUB BRAKE (T)
SUB BRAKE (S)
CONTROL LEVER
CONT. PLATE LEVER
MODE CAM GEAR
SLIDE PIN
MAIN SLIDE PLATE
SUPPLY BRAKE
TAKE-UP BRAKE
TAKE-UP BRAKE
CAM GROOVE 3.
CAM SLIDE ASS'Y
REEL GEAR (T)
ACT BRAKE LEVER
CAPSTAN MOTOR
REEL DRIVE BELT
ACT CLUTCH LEVER
BRAKE CONT. SLIDE
REEL GEAR (S)
CAPSTAN SOFT BRAKE
SUPPLY BRAKE
TAKE-UP BRAKE
REEL GEAR (T)
ACT BRAKE SLIDE

Fig. 2-8 CONSTRUCTION OF BRAKE CONTROL PLATE (AT BRAKE MODE)

2-2-5. Brake Lock Release Mechanism (FF/REW→STOP Mode)

The brake lock momentary release mechanism is shown in Fig. 2-9 ⓐ, ⓑ and Fig. 2-10.
In the FF/REW mode (Fig. 2-9 ⓐ) mechanical elastic load is given to the BRAKE LOCK LEVER mounted on the BRAKE CAM SLIDE which causes the brake to operate, and it is locked to the high-speed rotary axle of the 1st reducing section of the loading motor.

ⓐ changes from brake mode or lock released state to FF/REW, STOP mode.

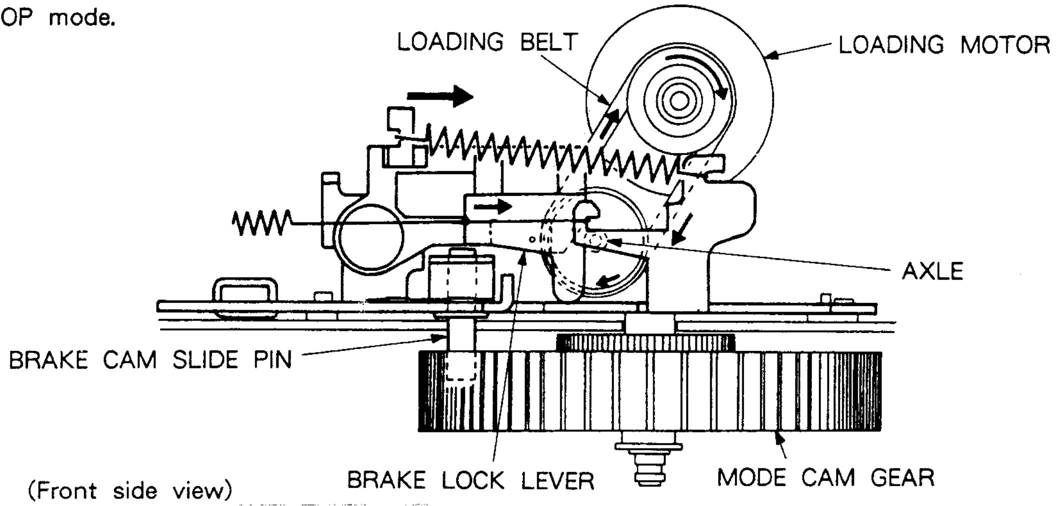

LOADING BELT
LOADING MOTOR
AXLE
BRAKE CAM SLIDE PIN
(Front side view)
BRAKE LOCK LEVER
MODE CAM GEAR

Fig. 2-9 ⓐ BRAKE LOCK & RELEASE MECHANISM

At the time of a shift to the STOP mode from the FF/REW (Fig. 2-9 ⓑ), the BRAKE LOCK LEVER releases the lock on slight rotation of the axle by contact between the rotary shaft and the friction resistance so that the brake can be instantaneously applied to the reel. The lock release speed is almost the same as the start-up of the loading motor. So, the its response to the brake is very quick, and construction is simplified also.

ⓑ Changes from FF/REW, STOP mode to BRAKE mode.

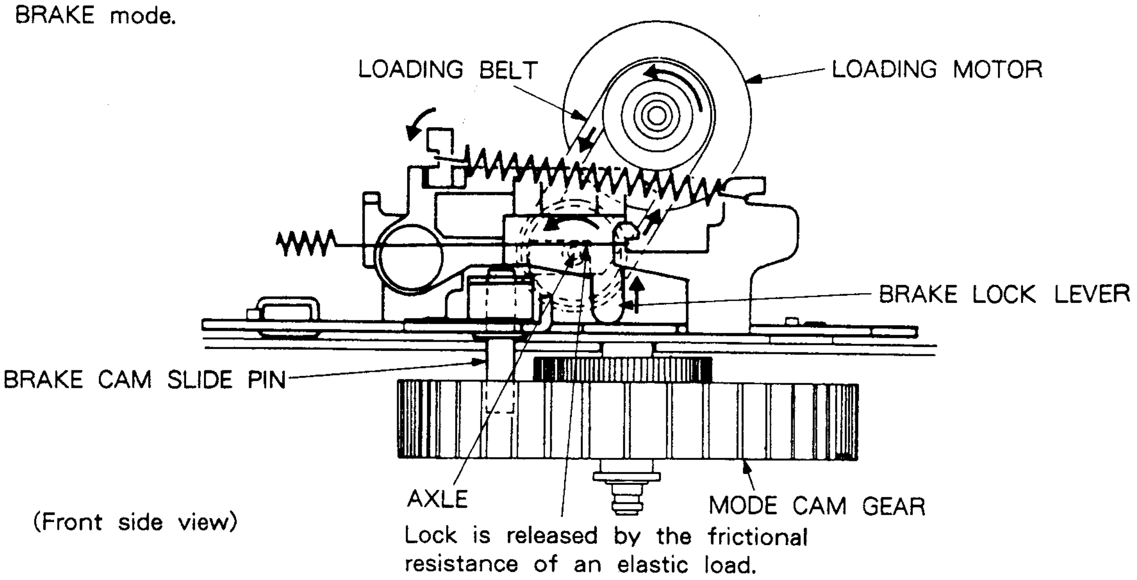

LOADING BELT
LOADING MOTOR
BRAKE LOCK LEVER
BRAKE CAM SLIDE PIN
(Front side view)
AXLE
MODE CAM GEAR
Lock is released by the frictional resistance of an elastic load.

Fig. 2-9 ⓑ BRAKE LOCK & RELEASE MECHANISM

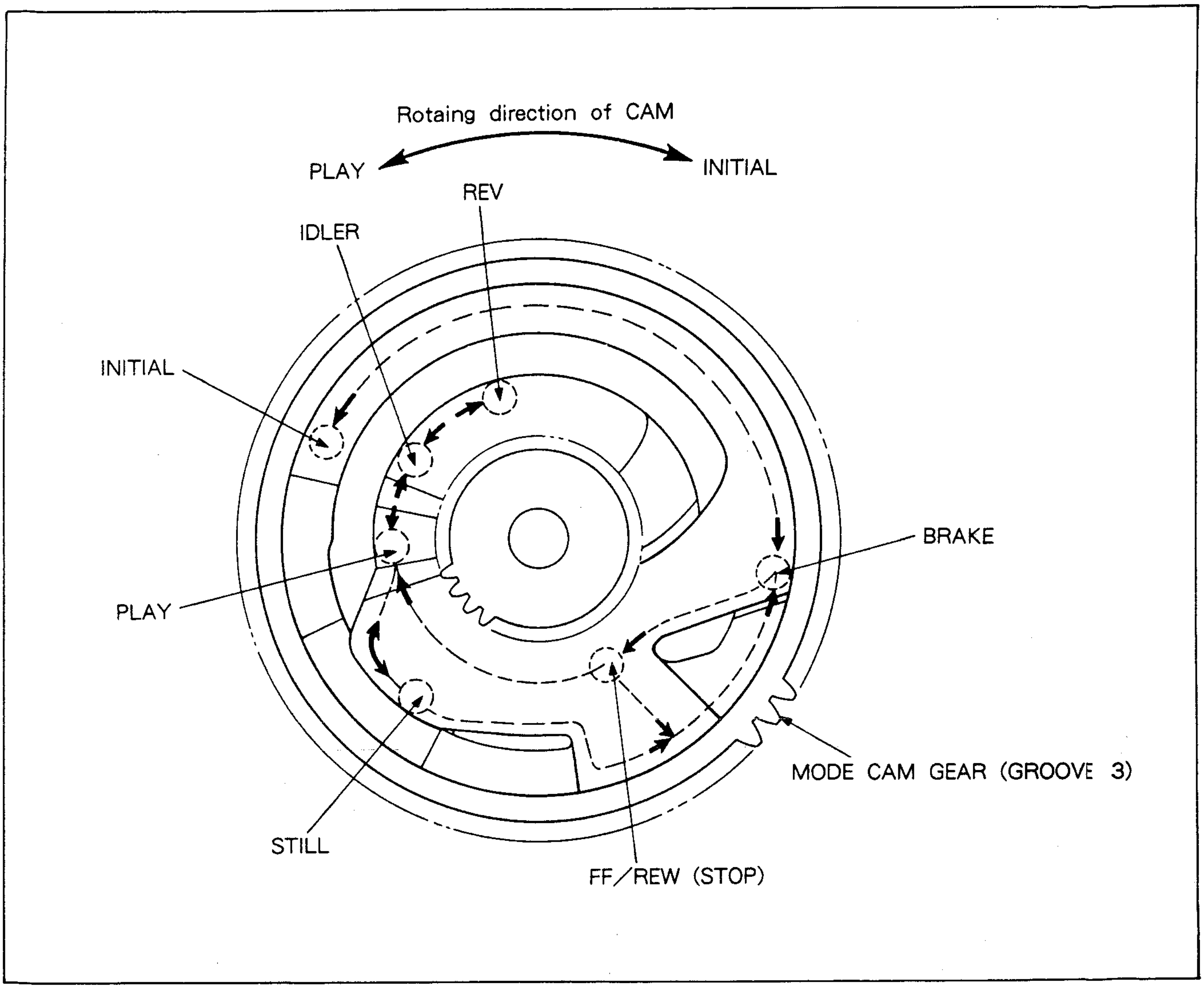

Rotaing direction of CAM
PLAY
INITIAL
REV
IDLER
INITIAL
BRAKE
PLAY
MODE CAM GEAR (GROOVE 3)
STILL
FF/REW (STOP)

Fig. 2-10 POSITIONING OF BRAKE CAM SLIDE-PIN ON THE GROOVE 3 OF MODE CAM GEAR

2-3. REEL TABLE DRIVE

2-3-1. Reel Table Drive Mechanism

This mechanism employs the system of driving the tape from the DD capstan motor via rubber belt. In the tape constant speed running mode for PLAY, F-SEARCH, and R-SEARCH, the capstan and the pinch roller are press-fitted to allow the tape to run at a constant speed. By providing a FRICTION MECHANISM in between the capstan motor and the reel table, the tape is taken up. In the FF/REW tape high-speed take-up mode, the capstan and the pinch roller are separated from each other, and the capstan motor and the reel table are linked direct by the clutch mechanism to carry out tape take-up. Also, to realize a thin type reel table drive section, the mechanism is simplified and the rotary parts are thinned for realization of physically compact design, and a step is provided on the reel table mounting section of the chassis by high-precision drawing process. A simplified figure of the drive mechanism is shown in Fig. 2-11 and Fig. 2-12. Power transmission to the pulley of the clutch mechanism section is done from the DD capstan motor via rubber belt.

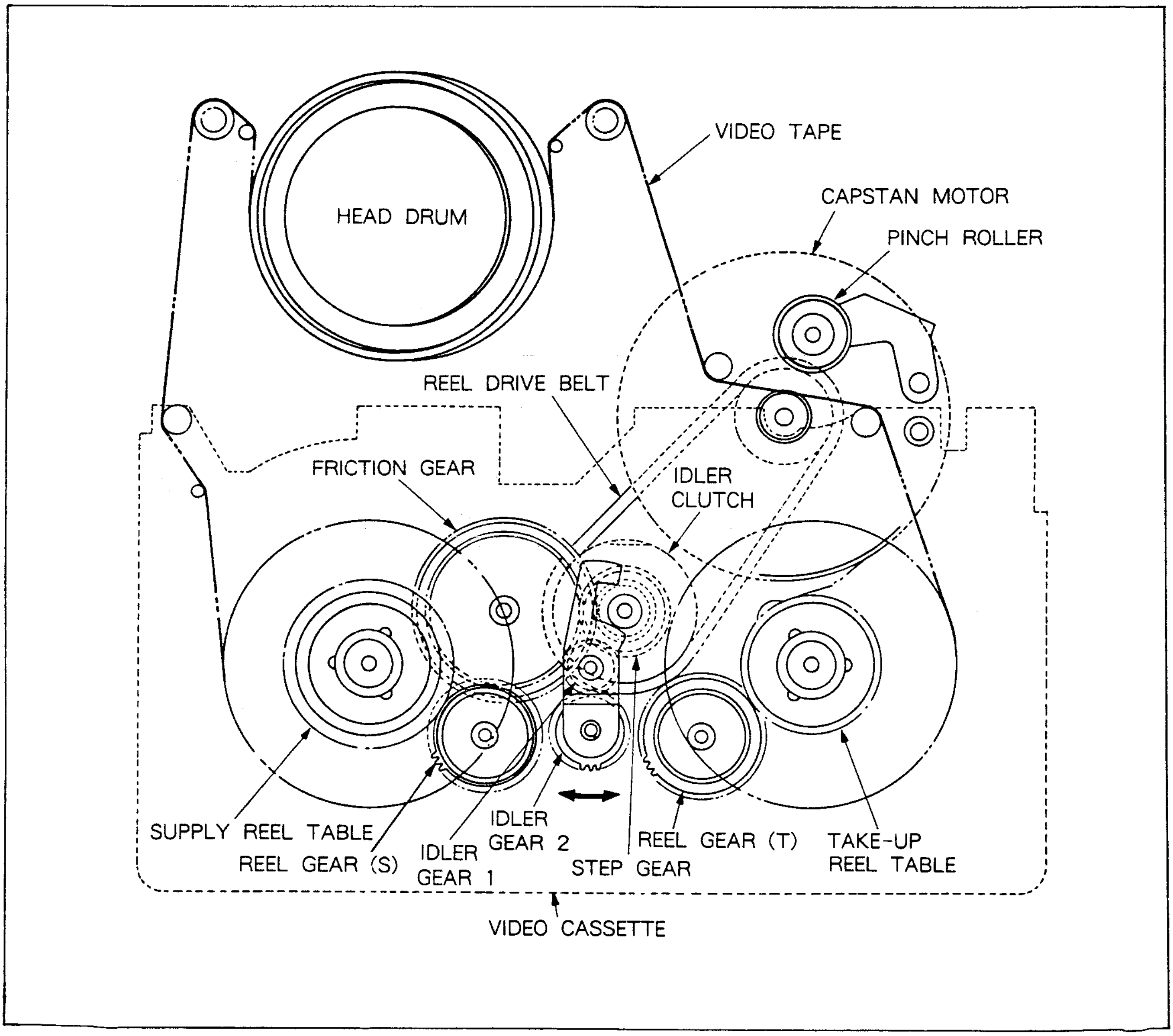
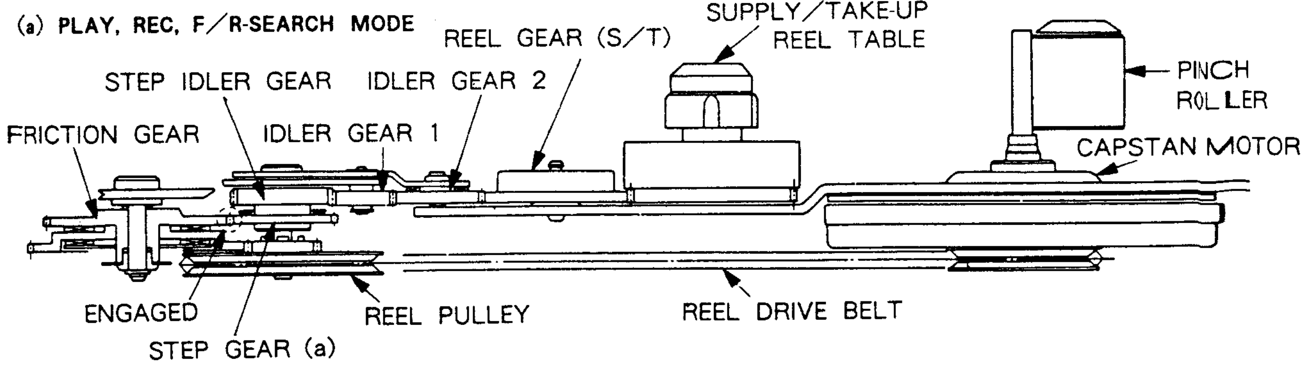

VIDEO TAPE
CAPSTAN MOTOR
PINCH ROLLER
HEAD DRUM
REEL DRIVE BELT
FRICTION GEAR
IDLER CLUTCH
SUPPLY REEL TABLE
REEL GEAR (S)
IDLER GEAR 1
IDLER GEAR 2
STEP GEAR
REEL GEAR (T)
TAKE-UP REEL TABLE
VIDEO CASSETTE

Fig. 2-11 REEL TABLE DRIVE

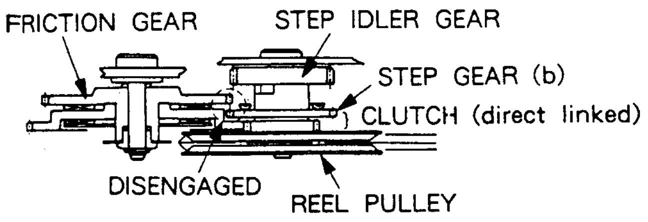
At that time, the reel table winding speed and the torque needed in a wide variety of modes are obtained by shifting the up and down STEP GEAR positioned at the upper section of pulley. The selection of the STEP GEAR is precision controlled by the MODE CAM GEAR via the BRAKE CONTROL SLIDE. With the up and down STEP GEAR down, the clutch mechanism is direct linked, and the transmission power from the capstan motor is sent to the reel table via IDLER GEAR assembly and REEL GEAR (S/T). On the other hand, FRICTION MECHANISM acts between the pulley and the STEP GEAR when the up and down STEP GEAR are in the elevated state, thereby controlling the transmission torque for generation of the take-up slip. Normally, it is desirable that the take-up torque of the reel table is higher in the R-SEARCH mode than that in the PLAY mode. This is because in the forward tape running the tape winding load to the HEAD DRUM has to be taken care of the capstan and the pinch roller.
While, in the reverse tape running mode the winding load has to be taken on the take-up reel table. In the special playback operation, a mechanism for varying the take-up torque of the reel table is required to be changed depending upon the running direction of the tape. But in this mechanism, the torque selection is made by varying the reduction speed ratio up to the reel table from the capstan motor on both the forward side and the reverse side of the tape. Also, design simplification of the selection mechanism is realized by using a single friction mechanism. In other words, the take-up torque necessary for forward/reverse rotation is obtained by controlling the capstan motor speed. Rotation speed and torque needed for each mode of operation are converted by clutch mechanism for transmission of the drive power to the idler mechanism. The left and right moving IDLER GEAR assembly is automatically rotated to the left and the right according to the direction of capstan motor rotation by using the friction force. Because the mechanism is so designed as to drive the reel table of the side on which the tape is transported by the capstan and pinch roller, the forward and reverse constant speed drive (the PLAY, F/R SEARCH modes) is carried out in the state in which the FRICTION MECHANISM is being operated (Fig. 2-12 ⓐ) On the other hand, in the condition in which the friction mechanism is not in operation, the forward/reverse high speed drive (FF/REW mode) is made possible (Fig. 2-12 ⓑ). Also, the reel drive in all modes is taken care of by the single left and right moving idler for design simplification.

The idler body employs gear drive to improve reliability with a view to realizing parts thinning while securing the transmission reliability. Using a resin molded gear as material of an idler, the efficiency of the entire reel drive system has been improved because there are no deformation and loss, and minimized rotation moving torque necessary for biting-in as in the case of a material such as rubber which shows considerable elastic deformation, etc. Further in this mechanism, an intermediate gear is provided in between the reel side and the idler to minimize the rotating and moving angle of the left and right moving idlers, thereby holding the reversing time to a minimum when shifting to the tape running direction change mode. This results in significantly reduced possibility of tape looseness.

(a) PLAY, REC, F/R-SEARCH MODE



(b) F-FWD/REW, STOP MODE



(a) The clutch mechanism is disengaged, and rotational force is transmitted through the friction mechanism. (Constant speed rotating mode)

(b) Direct transmission is obtained by disengaging the friction mechanism with a clutch mechanism. (High-speed rotating mode)

Fig. 2-12 REEL TABLE DRIVE (SIDE VIEW)

2-3-2. Reel Table Drive Clutch Lock and Release Mechanism

As described in the preceding section, using the selection of the step gear (CLUTCH MECHANISM), two mechanisms which are driven by being selected via direct drive or via FRICTION MECHANISM from the capstan motor, to execute the reel table drive. The operating status of the clutch lock and the releasing mechanism is shown in Fig. 2-13.

Fig. 2-13 ① shows the tape unloading position (INITIAL position) when the power for the mechanism operating mode is switched off.

At that times all the levers are in the initial positions, and the clutch is released also so that a route for reel table drive is created via a friction mechanism.

Fig. 2-13 ② shows that the mechanism operation mode has executed the tape loading and that it has completed its movement to the STOP (stand-by), FF/REW position.

At this time, the CLUTCH ACT LEVER is operated by the hook of the ACT BRAKE SLIDE to move the ACT CLUTCH LEVER in the direction of arrow via the CLUTCH LEVER and the CLUTCH CHANGE LEVER. Now, the up and down STEP GEAR is placed into the direct coupled state. In the FF/REW mode, the reel table is directly driven so that the rotation of the capstan motor is directly transmitted to make high-speed rotation drive possible. When shifting the mode to the STOP from the FF/REW in this condition, the mechanism mode position is once moved back to the brake position, and when the reel table brake is instantaneously applied, the clutch is released once at the same time, after which it returns to the same mechanism mode as the FF/REW mode once again. Now, it is placed in a waiting state in the same condition of the STOP mode as shown in Fig. 2-13 ②.

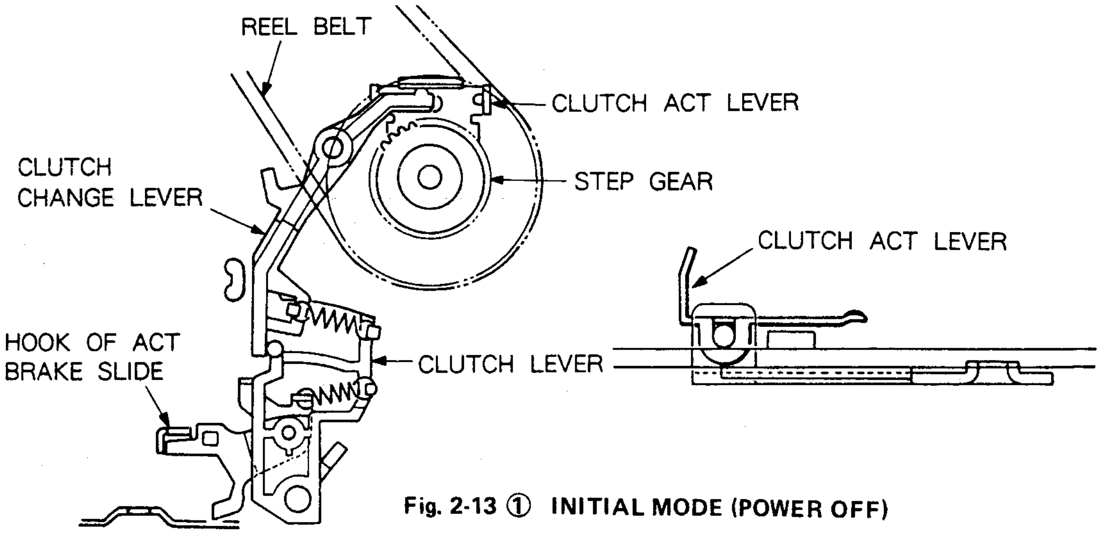

REEL BELT
CLUTCH ACT LEVER
CLUTCH CHANGE LEVER
STEP GEAR
CLUTCH ACT LEVER
HOOK OF ACT BRAKE SLIDE
CLUTCH LEVER

Fig. 2-13 ① INITIAL MODE (POWER OFF)

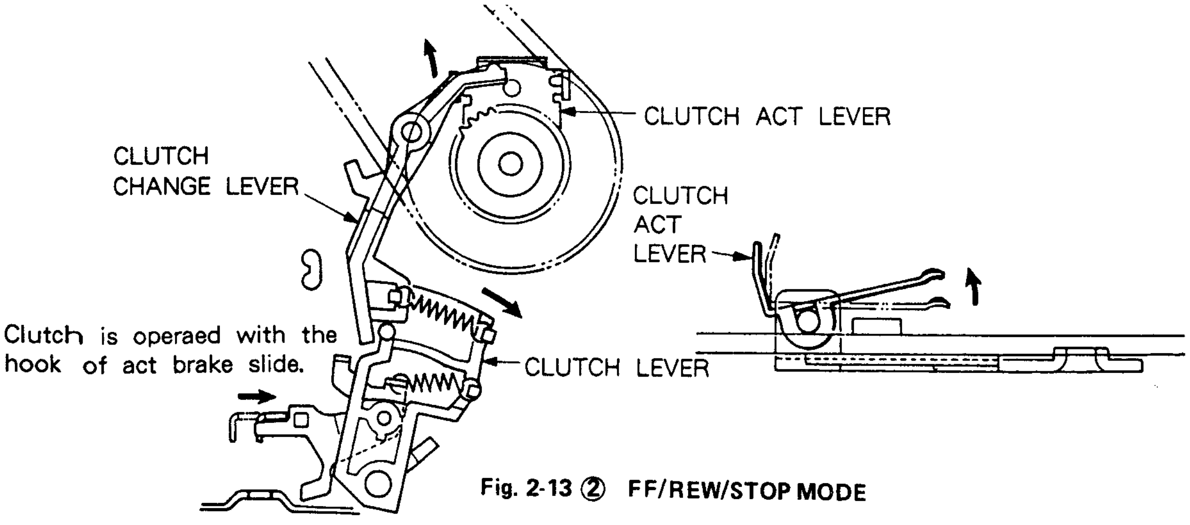

CLUTCH ACT LEVER
CLUTCH CHANGE LEVER
CLUTCH ACT LEVER
Clutch is operaed with the hook of act brake slide.
CLUTCH LEVER

Fig. 2-13 ② FF/REW/STOP MODE

Fig. 2-13 ① – ③ REEL TABLE DRIVE CLUTCH LOCK AND RELEASE MECHANISM

Fig. 2-13 ③ shows the completion state of a shift to the PLAY mode via the STILL mode from the STOP (FF/REW) mode for the mechanism mode position.
In the case of this mode shifting, the movement of the BRAKE ACT SLIDE remains fixed. So, the CLUTCH ACT LEVER should be unlocked by the movement of the hook of the MAIN SLIDE PLATE to cause the clutch to be released. This movement in turn causes the capstan motor rotation to be transmitted via the friction mechanism. So, the constant speed rotation drive necessary for the PLAY mode and SEARCH mode is made possible.

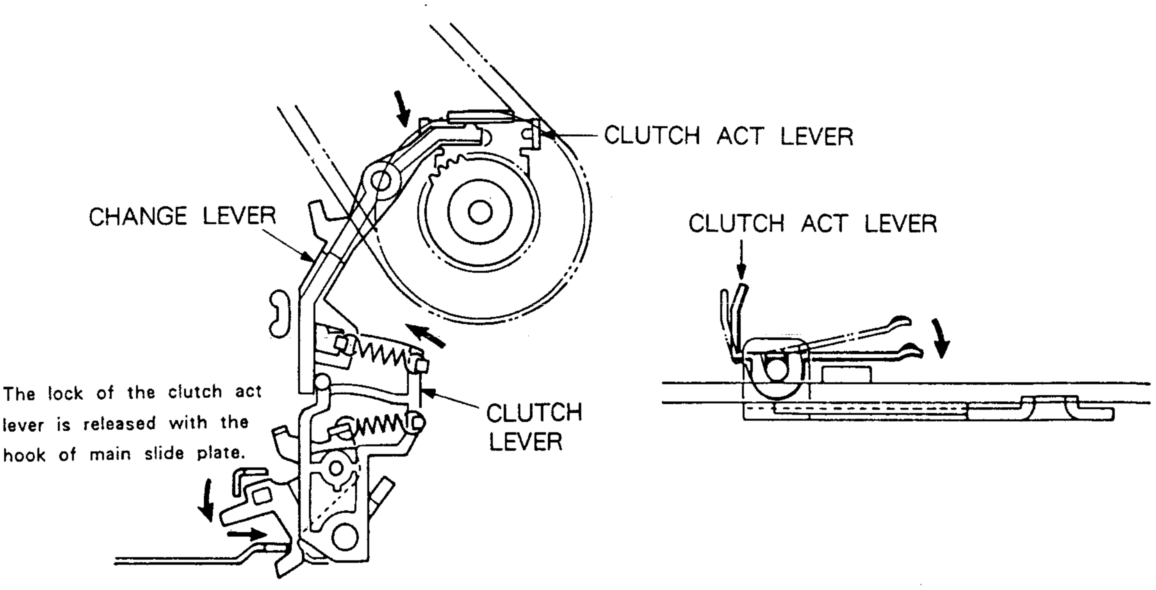

CLUTCH ACT LEVER
CHANGE LEVER
CLUTCH ACT LEVER
The lock of the clutch act lever is released with the hook of main slide plate.
CLUTCH LEVER

Fig. 2-13 ③ FF/REW/STOP MODE → STILL MODE → PLAY MODE

2-4. FRONT LOADING DRIVE SELECTION MECHANISM

In the P-90 mechanism, the motor dedicated to the use of front loading is not employed. The drive source is utilized instead of the tape loading motor. As shown in Fig. 2-14 ⓐ/ⓑ, during the front loading the FRONT LOAD WORM GEAR directly coupled to the tape loading motor axle and the FRONT HELICAL GEAR with several teeth missing are engaged with each other and rotated for transmission of the drive force to the front loading mechanism. When the cassette tape is inserted completely in the mechanism, the FRONT HELICAL GEAR is automatically disengaged from the FRONT LOAD WORM GEAR. After that, the tape loading operation is performed without the tape loading motor drive force being transmitted to the front loading mechanism.

While the drive force is being transmitted to the front loading mechanism, the CAM GROOVEs of the before-mentioned MAIN CAM GEAR and the MODE CAM GEAR are flat in cam line pattern. These are therefore held without changing the mode state of the mechanism in any way.

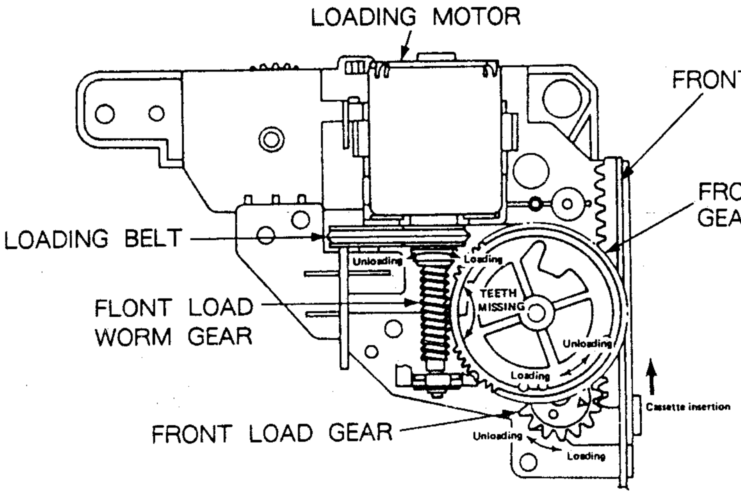

LOADING MOTOR
FRONT LOAD RACK
FRONT HELICAL GEAR
LOADING BELT
FLONT LOAD WORM GEAR
FRONT LOAD GEAR
Unloading
Loading
TEETH MISSING
Unloading
Loading
Cassette insertion
Unloading
Loading

Fig. 2-14 ⓐ FRONT LOADING DRIVE SELECTION MECHANISM (CASSETTE INSERTED POSITION)

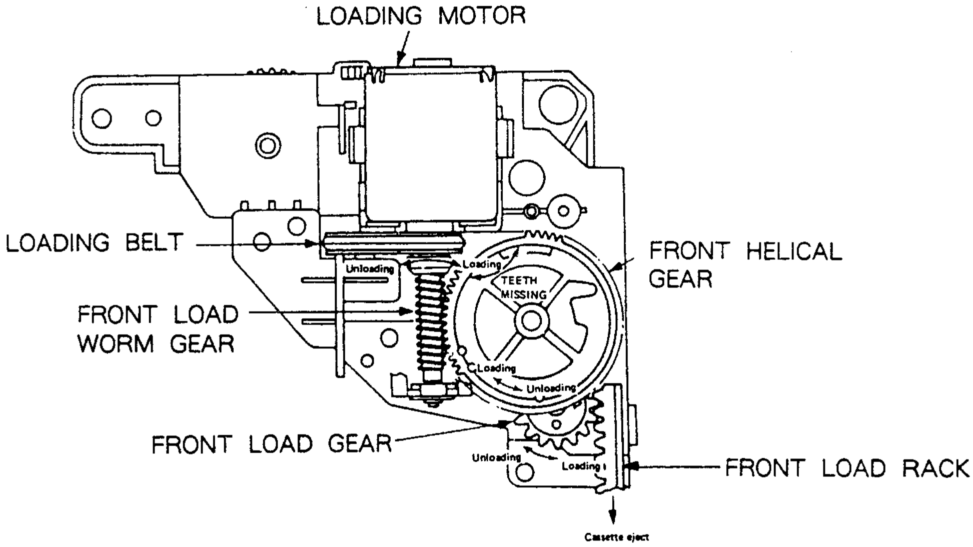

LOADING MOTOR
LOADING BELT
FRONT HELICAL GEAR
FRONT LOAD WORM GEAR
FRONT LOAD GEAR
FRONT LOAD RACK
Unloading
Loading
TEETH MISSING
Loading
Unloading
Unloading
Loading
Cassette eject

Fig. 2-14 ⓑ FRONT LOADING DRIVE SELECTION MECHANISM (CASSETTE EJECTED POSITION)

(A) Cassette inserting operation

When inserting a cassette from the cassette ejected state of Fig. 2-14 ⓑ, the FL START SWITCH shown in Fig. 2-15 is turned OFF, to cause the loading motor to be rotated in the direction of insetting. As a result, the FRONT LOAD RACK is drawn in, and the front loading is made up to the cassette tape completion point. So, it is locked in the grooves shown in Fig. 2-15 to complete cassette inserting. At that time, the FRONT HELICAL GEAR is positioned at ⓐ of Fig. 2-14, and is released from the front loading mechanism, therefore, the tape loading operation is continuously performed.

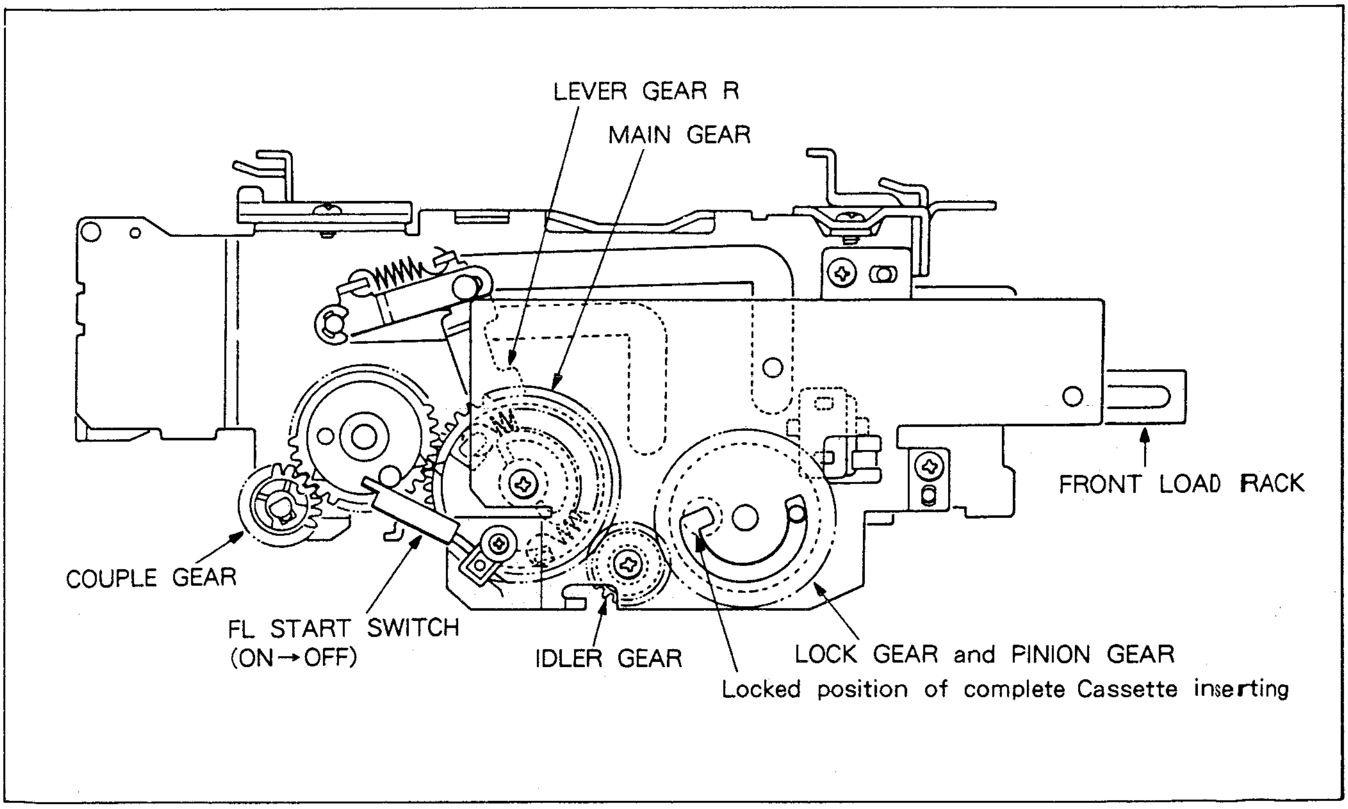

LEVER GEAR R
MAIN GEAR
FRONT LOAD RACK
COUPLE GEAR
FL START SWITCH
(ON→OFF)
IDLER GEAR
LOCK GEAR and PINION GEAR
Locked position of complete Cassette inserting

Fig. 2-15 CASSETTE HOLDER MECHANISM (CASSETTE INSERTING OPERATION)

(B) Cassette ejection operation

The components of the front loading mechanism is shown in Fig. 2-16.

When ejecting the cassette from the inserted state shown in Fig. 2-14 ⓐ, the FRONT ACT LEVER is pushed in the direction of arrow due to the ACT SLIDE PLATE moves in the direction of arrow shown in Fig. 2-17. As a result, the FRONT LEVER assembly is turned counterclockwise via the FRONT LOAD SLIDE to cause the FRONT HELICAL GEAR to be engaged with the FRONT LOAD WORM GEAR of the loading motor. At that time, the loading motor is being rotated counterclockwise, so that the FRONT HELICAL GEAR is caused to be rotated counterclockwise also to carry out the front unloading via the FRONT LOAD GEAR and the FRONT LOAD RACK. At the same time, the FRONT ACT LEVER is operated counterclockwise by the hook of the FRONT HELICAL GEAR. This releases the lock being pushed in the direction of arrow indicated by the ACT SLIDE PLATE. So, the FRONT LOAD SLIDE assembly now moves to the initial position to prepare for the next ejection operation. Incidentally, the movement of the FRONT LEVER assembly performs an important function of positioning the FRONT HELICAL GEAR (Fig. 2-14 ⓐ) upon completion of cassette mounting, in addition to the cassette eject start-up operation.

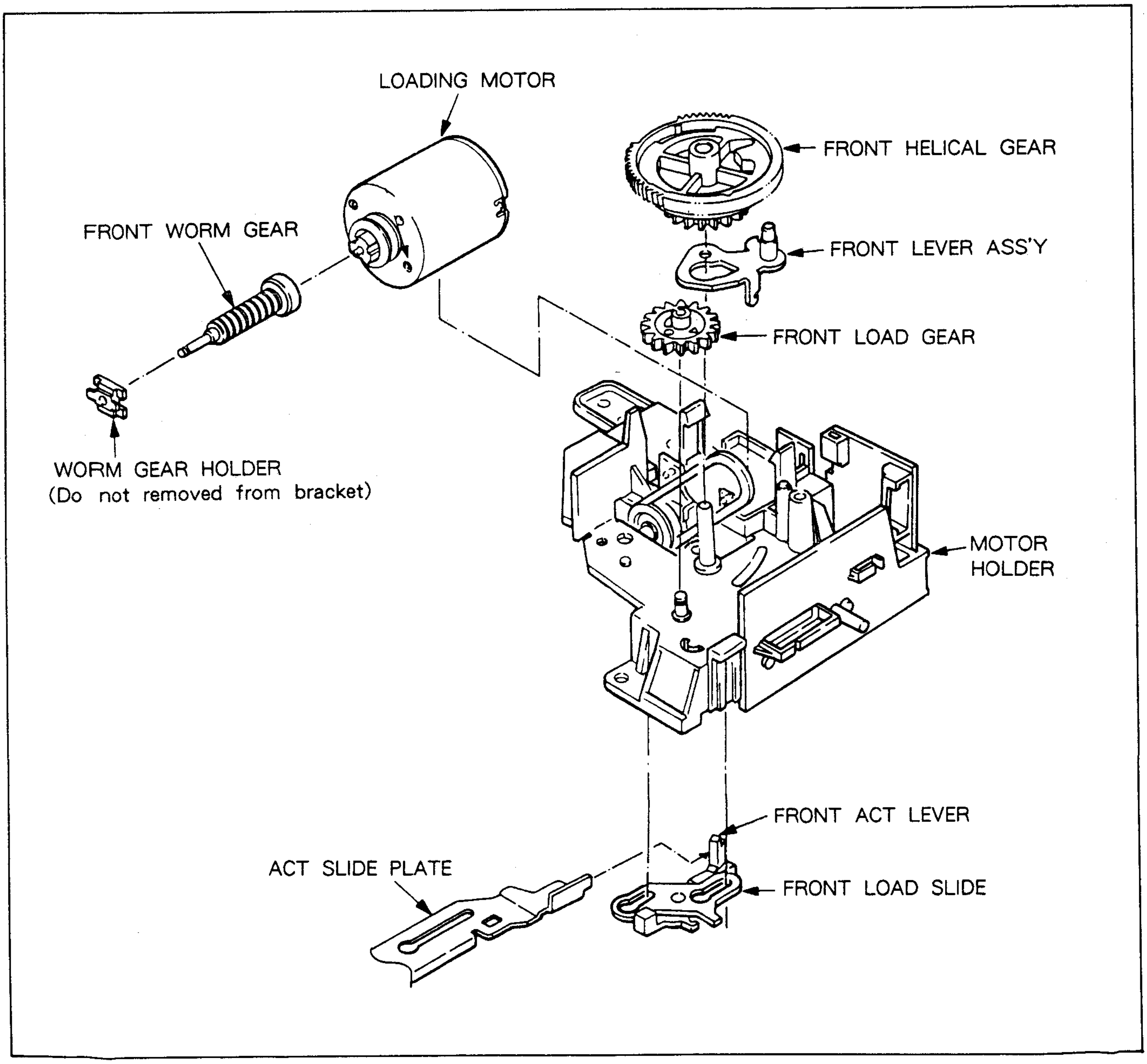
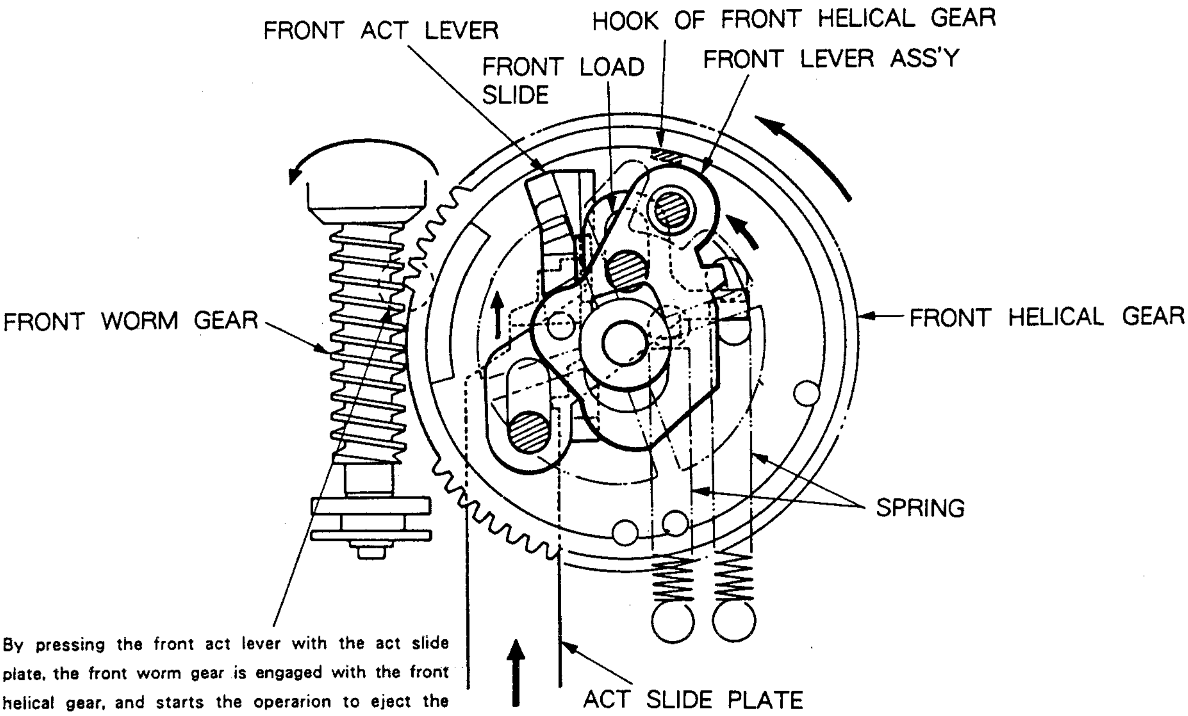

LOADING MOTOR
FRONT HELICAL GEAR
FRONT WORM GEAR
FRONT LEVER ASS'Y
FRONT LOAD GEAR
WORM GEAR HOLDER
(Do not removed from bracket)
MOTOR
HOLDER
FRONT ACT LEVER
ACT SLIDE PLATE
FRONT LOAD SLIDE

Fig. 2-16 FRONT LOADING DRIVE SELECTION MECHANISM


FRONT ACT LEVER
HOOK OF FRONT HELICAL GEAR
FRONT LOAD SLIDE
FRONT LEVER ASS'Y
FRONT WORM GEAR
FRONT HELICAL GEAR
SPRING
ACT SLIDE PLATE

By pressing the front act lever with the act slide plate, the front worm gear is engaged with the front helical gear, and starts the operarion to eject the cassette.

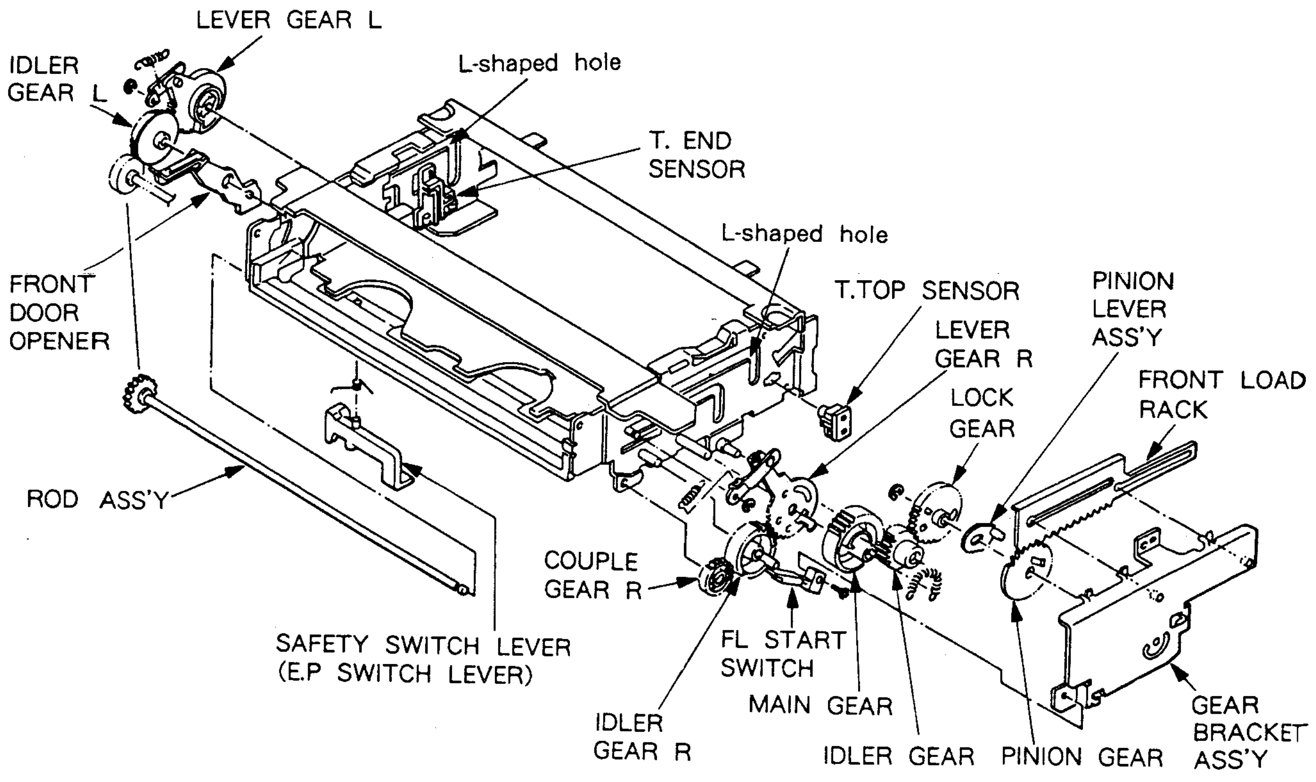
Fig. 2-17 CASSETTE EJECTION START OPERATION (See through top view)

2-5. CASSETTE HOLDER MECHANISM

2-5-1. Components

The exploded view of the cassette holder mechanism is shown in Fig. 2-18. This mechanism consists of a cassette tray for feeding the cassette tape to the specified position of the mechanism chassis, a side plate provided with L type holes for supporting and guiding it, the top plate for regulating the width of left and right, and a group of gears for driving the cassette tray.

The entire mechanism is of independent construction apart from the mechanism body. The holder is fixed on the mechanism chassis by inserting the pawls at two points and tightening the setscrews at two points, or at a total of four points.



LEVER GEAR L
IDLER GEAR L
L-shaped hole
T. END SENSOR
L-shaped hole
FRONT DOOR OPENER
T.TOP SENSOR
PINION LEVER ASS'Y
LEVER GEAR R
FRONT LOAD RACK
LOCK GEAR
ROD ASS'Y
COUPLE GEAR R
SAFETY SWITCH LEVER (E.P SWITCH LEVER)
FL START SWITCH
MAIN GEAR
IDLER GEAR R
IDLER GEAR
PINION GEAR
GEAR BRACKET ASS'Y

Fig. 2-18 EXPLODED VIEW OF THE CASSETTE HOLDER MECHANISM

2-5-2. Description of Cassette Holder

The cassette holder is of motor-less design, as the lowering of mechanism height and driving source are done by the loading motor of the mechanism body.

As a substitute for the worm gear system hitherto used in the major drive section for the drive selection mechanism mentioned in section 2-4., the RACK LOADING system is adopted in this cassette holder mechanism. By this mechanism the motor-less design can be realized. An exploded view of the mechanism is shown in Fig. 2-19. A description of the operation is made below along with Fig. 2-19. To press-fit the cassette tape after sending it onto the mechanism chassis, the PINION GEAR section is triple construction. The FRONT LOAD RACK side and the IDLER GEAR side are independently engaged. The PINION GEAR and the LOCK GEAR are connected from the PINION LEVER PIN riveted to the PINION LEVER. Even after feeding the cassette tape to the specified position of the mechanism chassis, the FRONT LOAD RACK slides, giving the rotation to the PINION GEAR which is engaged with the FRONT LOAD RACK. At that time, a pin is dropped into the groove section provided on the GEAR BRACKET ASS'Y.

The other LOCK GEAR is fixed by this PINION LEVER PIN, and the cassette tape is press-fitted onto the mechanism chassis by linked IDLER GEAR. The before-mentioned FRONT LOAD RACK and the PINION GEAR are set free after dropping the PINION LEVER PIN into the groove section. So, the drive force of the loading motor is sent to the mechanism body.

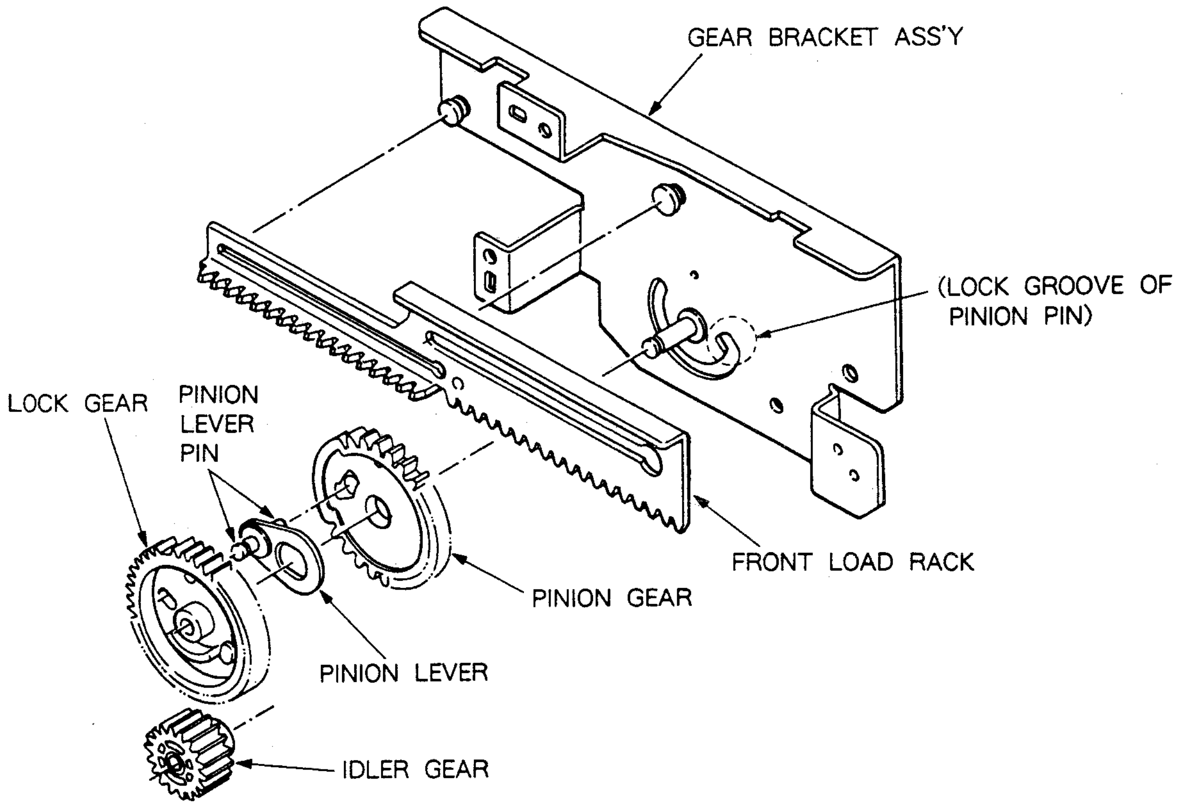


Fig. 2-19 RACK LOADING MECHANISM OF CASSETTE HOLDER

3. MECHANISM CONTROL

3-1. MODE ARRANGEMENT

This mechanism is arranged in such a mode layout as shown in Table. 3-1 and as described in section 2-1. The mode sensing switch described below is used for control of these modes.

3-2. MODE DETECTION SWITCH

For mode detecting one leaf switch (FL START SWITCH and one rotary switch (MECHANISM MODE SWITCH) are used in combination.

Mechanism Mode	Mechanism Mode Switch			HEX DATA	Function	Main Mode Shifting Conditions	VTR Operation Mode
	3	2	1				
EJECT	–	–	–		Eject position		EJECT
					Front loading/Unloading		
SHORT REW	–	–	–		Take up operation in the tape end position		Low side of ⑤. Sensed upon IN
INITIAL	1	1	1	⑦	Power off position		Power off when tape is loaded completely
					Tape unloading position Tape loading Tape loading ending position		
BRAKE	0	0	1	①	Main brake applying position		
STOP / FF/REW	0	1	0	②	STOP waiting and FF/REW (the head motor rotation)		STOP, FF/REW
STILL	0	1	1	③	The positions of STILL, SLOW or F-ADV.		STILL, SLOW, F-ADV
PLAY	1	0	0	④	From FWD direction Normal running mode		PLAY, F-SEARCH
IDLER	1	0	1	⑤	Forward/reverse changeover position		PAUSE
REV	1	1	0	⑥	From REV direction Normal running mode		R-SEARCH

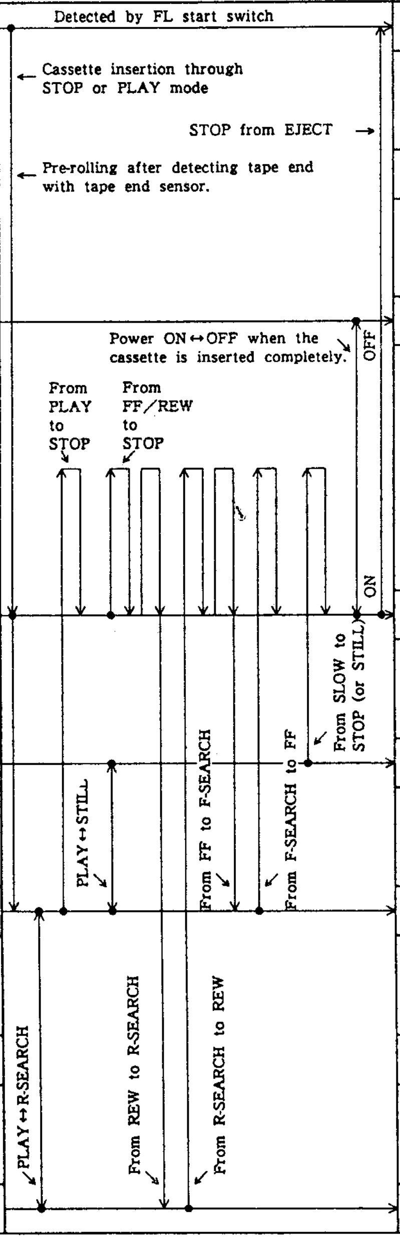

Detected by FL start switch
Cassette insertion through STOP or PLAY mode
STOP from EJECT
Pre-rolling after detecting tape end with tape end sensor.
Power ON↔OFF when the cassette is inserted completely.
OFF
ON
From PLAY to STOP
From FF/REW to STOP
From SLOW to STOP (or STILL)
PLAY↔STILL
From FF to F-SEARCH
From F-SEARCH to FF
PLAY↔R-SEARCH
From REW to R-SEARCH
From R-SEARCH to REW

Table 3-1

(1) Switch component

The mode switch consists of FL START SWITCH for detecting the cassette ejection and insertion, and MECHANISM MODE SWITCH for detecting the each mode position of the mechanism. As can be understood from Fig. 3-1, the MECHANISM MODE SWITCH rotates in excess of 360 degrees. Therefore, the sensing of a signal from the MECHANISM MODE SWITCH is done by the leaf switch.

In the P88 and P89 mechanisms, incidentally, short REW position is detected by the FL END SW, but in the P90 mechanism, the FL END SWITCH is not required due to a change in the internal structure of the MECHANISM MODE SWITCH.

(2) Mechanism mode switch

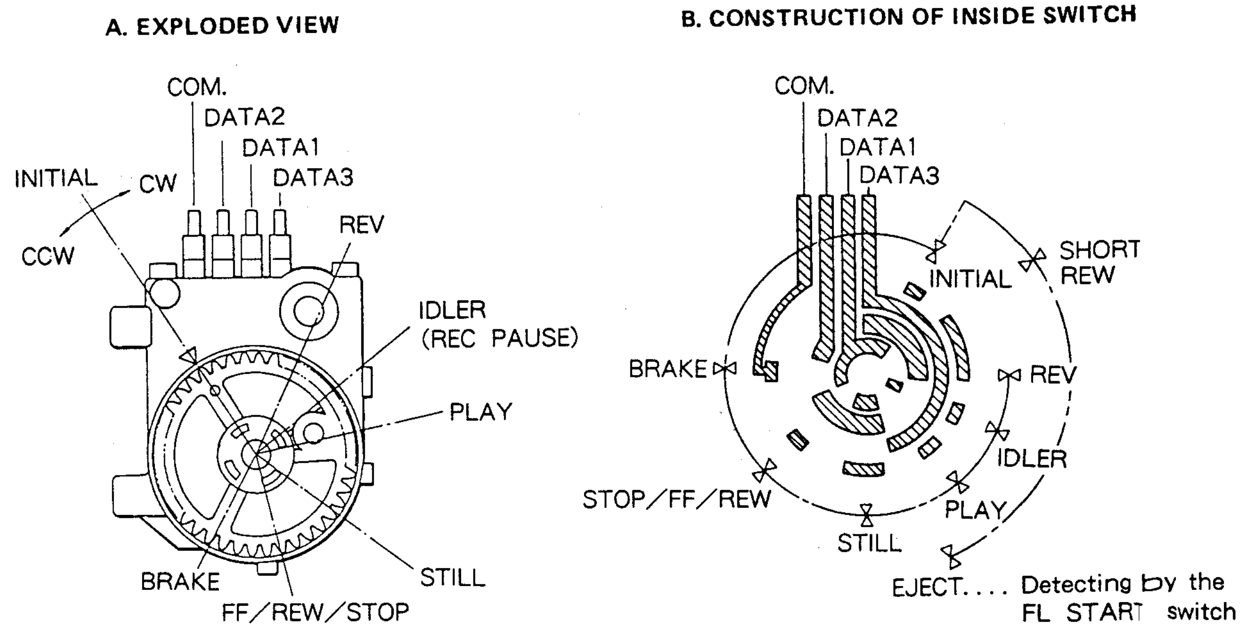
The mechanism mode switch consists of four terminals, namely, COM, DATA1, DATA2, and DATA3. These are processed as 3-bit signals for discrimination of seven modes.

The MECHANISM MODE SWITCH is not interchangeable with the hither to available black switch due to a change in its internal structure. Be sure therefore to use a blue switch.

3-3. CONSIDERATION TO FULL LOADING

① In the normal stop condition, the head drum is rotated to facilitate the start-up of the image at the time of playback, but it is conceivable that this is left undisturbed for an extended period of time. This may result in wear of the video head. For this reason, when five minutes elapse from the stop condition, the head drum stops rotating.

② To prevent the tape from being caught in the head drum due to dew forming, etc., the tape is housed in the unloaded cassette when turning the power off.



A. EXPLODED VIEW

COM.
DATA2
DATA1
DATA3
INITIAL
CW
CCW
REV
IDLER
(REC PAUSE)
PLAY
BRAKE
STILL
FF/REW/STOP

B. CONSTRUCTION OF INSIDE SWITCH

COM.
DATA2
DATA1
DATA3
INITIAL
SHORT
REW
BRAKE
REV
IDLER
STOP/FF/REW
PLAY
STILL
EJECT.... Detecting by the
FL START switch

Fig. 3-1 MECHANISM MODE SWITCH (ROTARY SWITCH)

4. MECHANISM MAINTENANCE AND CHECKING

4-1. PERIODIC CHECKING AND MAINTENANCE ITEMS AND SERVICE JIGS

The following maintenance and periodic checking procedures are recommended to ensure proper operation, and to protect the tape from dirt and damage. Also, these procedures should always be followed after repairing the unit.

4-1-1. Periodic Check Items

○ Cleaning ◎ Confirmation △ Lubrication

Part	Usage Time (hours)	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	Remarks
Tape Guide System	Tape running surfaces	○	○	○	○	○	○	○	○	○	○	
	ACE head	○	○	○	○	○	○	○	○	○	○	
	Drum (cylinder)	○	○	○	○	○	○	○	○	○	○	Head life depends heavily on operating conditions.
Drive System	Loading belt	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	Reel drive belt	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	Intermediate gear, pulley axles		△		△		△		△		△	Absolutely avoid oil on tape running surfaces.
	Capstan axles		△		△		△		△		△	
	Loading motor		◎		◎		◎		◎		◎	
Perfor-mance Check	Back tension torque		◎		◎		◎		◎		◎	47 ± 5 gcm
	Brake system		◎		◎		◎		◎		◎	
	FF, REV, PLAY torque		◎		◎		◎		◎		◎	FF : 600 gcm and over REW : 750 gcm and over REV : 150 to 240 gcm PLAY : 100 to 160 gcm

Note : The back tension torque is the value that has been measured by the cassette torque meter (VHJ-0016).
The torque of FF, REV, REW, and PLAY represent those measured with them locked by the torque gauge.
FF and REW are values 2 seconds after starting.

4-1-2. Cleaning

① Drum (COMPL CYLINDER) and Video Heads (See Fig. 4-1-1.)

1) Wrap a chamois leather around your finger and moisten it with methyl alcohol.
2) Move the chamois leather to left and right several times on the video head to clean. There is a video head also on the opposite side, so clean it likewise. In Hi-Fi models, clean the audio head also.
3) Clean the tape path surface of the cylinder in the same way.

Note : Always turn power off before cleaning. Do never move the chamois leather vertically or apply too much force to the head ; it may be damaged.

② Cleaning of the Tape Guide System (See Fig. 4-1-2.)

1) Set the EJECT mode and clean the tape guide system (tape guides, impedance roller, FTE head, ACE head, pinch rollers, capstan axles, etc.) with a chamois leather moistened with methyl alcohol.

Note : Make sure that no oil, grease, etc. adhere to the chamois leather and that heads are not damaged.

③ Cleaning of the Drive System

1) Clean the drive system (loading belt, reel drive belt, pulley, supply reel table, etc.) with a soft cloth moistened with methyl alcohol.

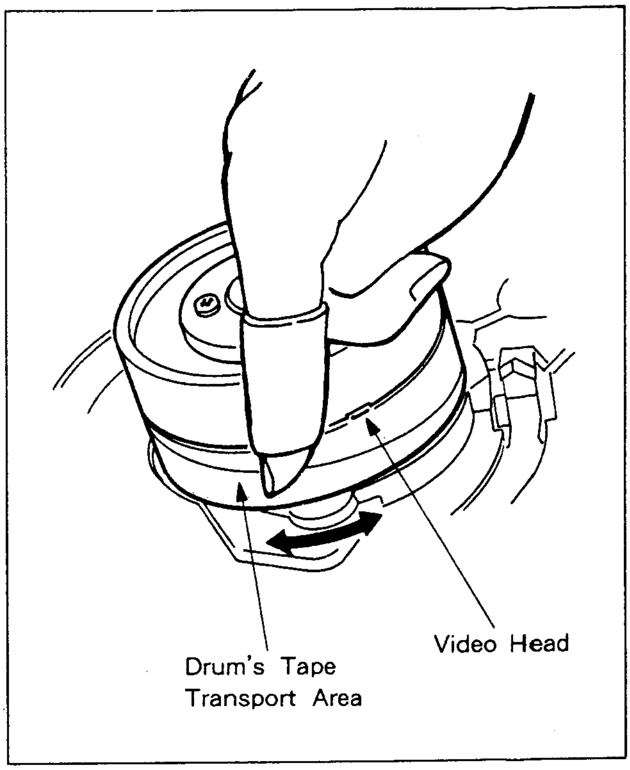

Video Head
Drum's Tape Transport Area

Fig. 4-1-1.

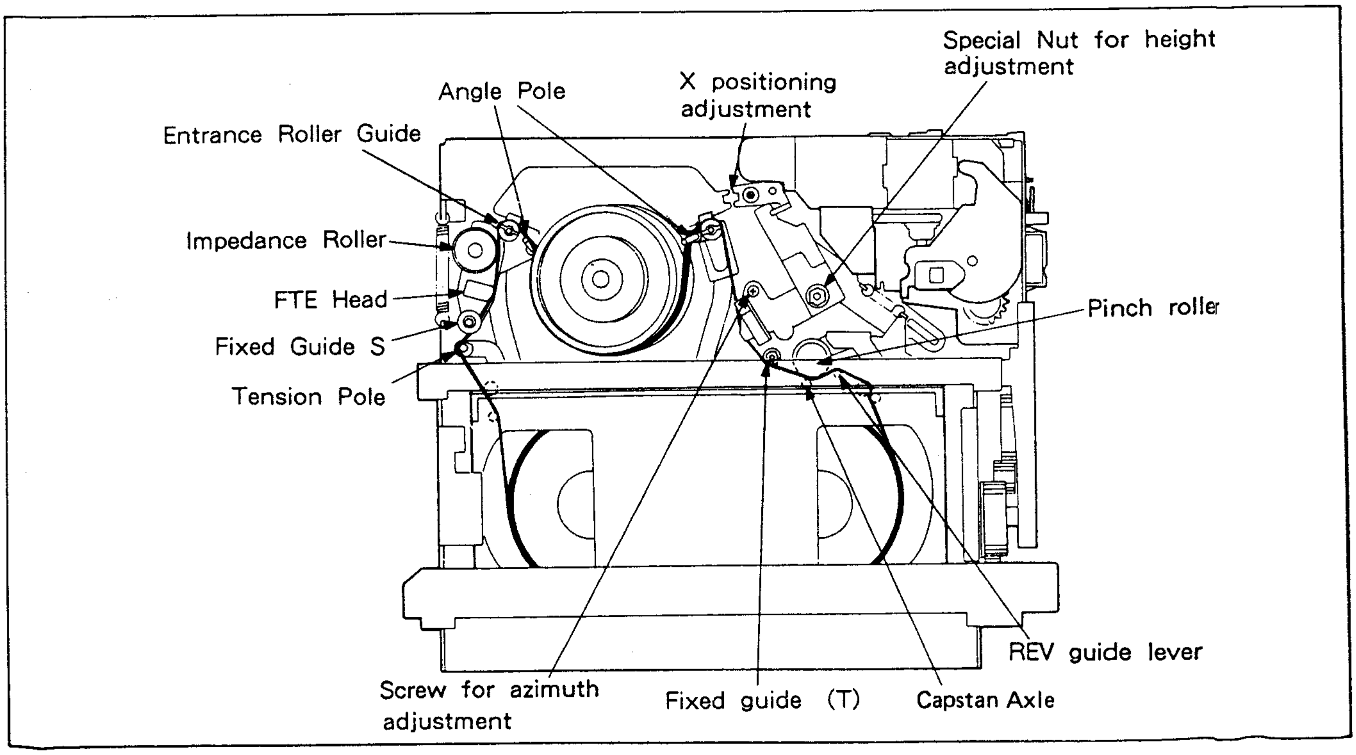
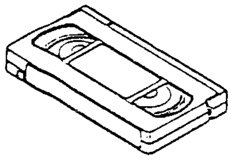

Special Nut for height adjustment
Angle Pole
X positioning adjustment
Entrance Roller Guide
Impedance Roller
FTE Head
Fixed Guide S
Tension Pole
Pinch roller
REV guide lever
Screw for azimuth adjustment
Fixed guide (T)
Capstan Axle

Fig. 4-1-2. Cleaning

4-1-3. Service Jigs

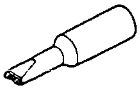
No.	Jig	Jig No.	Remarks
1	Alignment tape (PAL)	H-7099-175-H	SP monoscope, 7kHz (normal)
2	Eccentric screwdriver (VHJ-0003)	J-6082-044-A	For tape path adjustment
3	Nut box (VHJ-0048)	J-6082-045-A	For tape path adjustment
4	Torque gauge	H-7099-039-H	For reel take-up torque measurement
5	Torque gauge adapter	H-7099-035-H	For reel take-up torque measurement
6	Fixed guide height gauge (VHJ-0053)	J-6082-052-A	For fixed gaude (S) height adjustment
7	Torque gauge screwdriver (VHJ-0014)	J-6082-047-A	For screw fastening torque adjustment
8	3mm dia. bit for torque screwdriver (VHJ-0045)	J-6082-048-A	Spare bit for the torque gauge screwdriver
9	Video head removing tool (VHJ-0041)	J-6082-049-A	For upper drum removal
10	Mode selector (VHJ-0050)	J-6082-050-A	For mechanism mode selection
11	Master plane	H-7099-279-H	Reel table height
12	Reel disc height jig	H-7099-038-H	Reel table height
13	Mode selector relay board (VHJ-0075)	J-6090-008-A	Relay board for mode selector
14	PAL torque cassette (VHT-063S) (PAL)	J-6082-066-A	For back tension torque
15	26-pin flexible flat cable (VHJ-0064)	J-6090-006-A	Spare cable for mode selector
16	7-wire flat cable (VHJ-0076)	J-6090-009-A	Spare cable for relay board
17	REV guide lever removing tool (VHJ-0073)	J-6090-007-A	For REV guide lever removal

H-7099-153-H



No. 1

J-6082-044-A (VHJ-0003)



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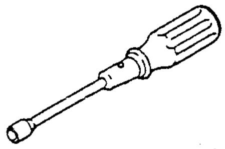
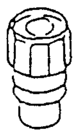
J-6082-045-A (VHJ-0048)



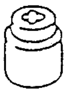
No. 3

H-7099-039-H



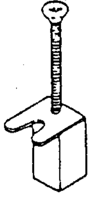
No. 4

H-7099-035-H



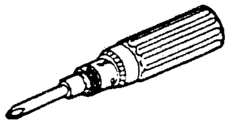
No. 5

J-6082-052-A (VHJ-0053)



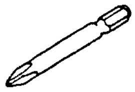
No. 6

J-6082-047-A (VHJ-0014)



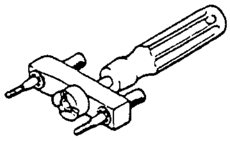
No. 7

J-6082-048-A (VHJ-0045)



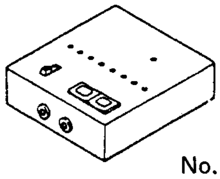
No. 8

J-6082-049-A (VHJ-0041)



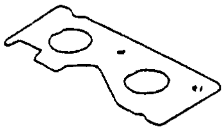
No. 9

J-6082-050-A (VHJ-0050)



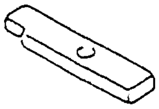
No. 10

H-7099-279-H



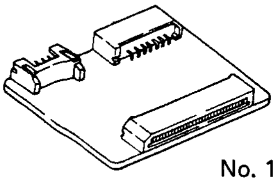
No. 11

H-7099-038-H



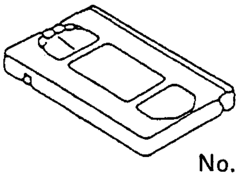
No. 12

J-6090-008-A (VHJ-0075)



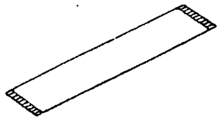
No. 13

J-6082-066-A



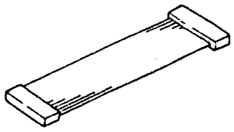
No. 14

J-6090-006-A (VHJ-0064)



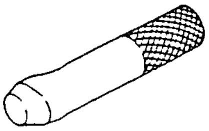
No. 15

J-6090-009-A (VHJ-0076)



No. 16

J-6090-007-A (VHJ-0073)



No. 17

4-2. MODE SELECTOR (VHJ-0050) HANDLING INSTRUCTIONS

The mode selector drives the loading motor of the P88 mechanism with its internal batteries (UM-2 × 4 = 6V), using LEDS to indicate the mode (EJECT, INITIAL, BRAKE, STOP/REW/FWD, STILL, PLAY, IDLER, REV) simultaneously with EJECT⇔REV mode changes.
Instead of the internal batteries, an external DC 6V power supply can also be used.

4-2-1. Part Names (See Fig. 4-2-1)

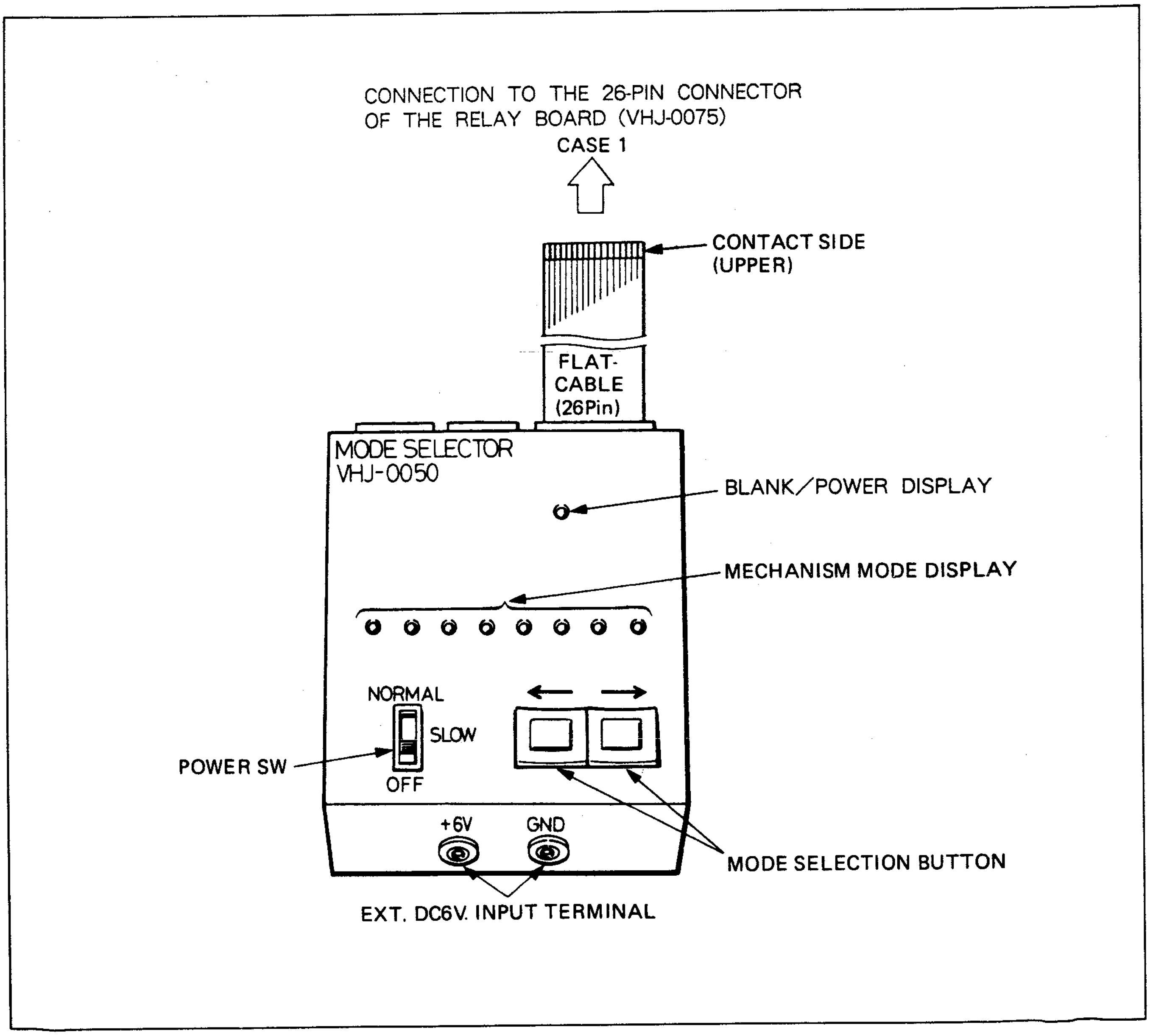
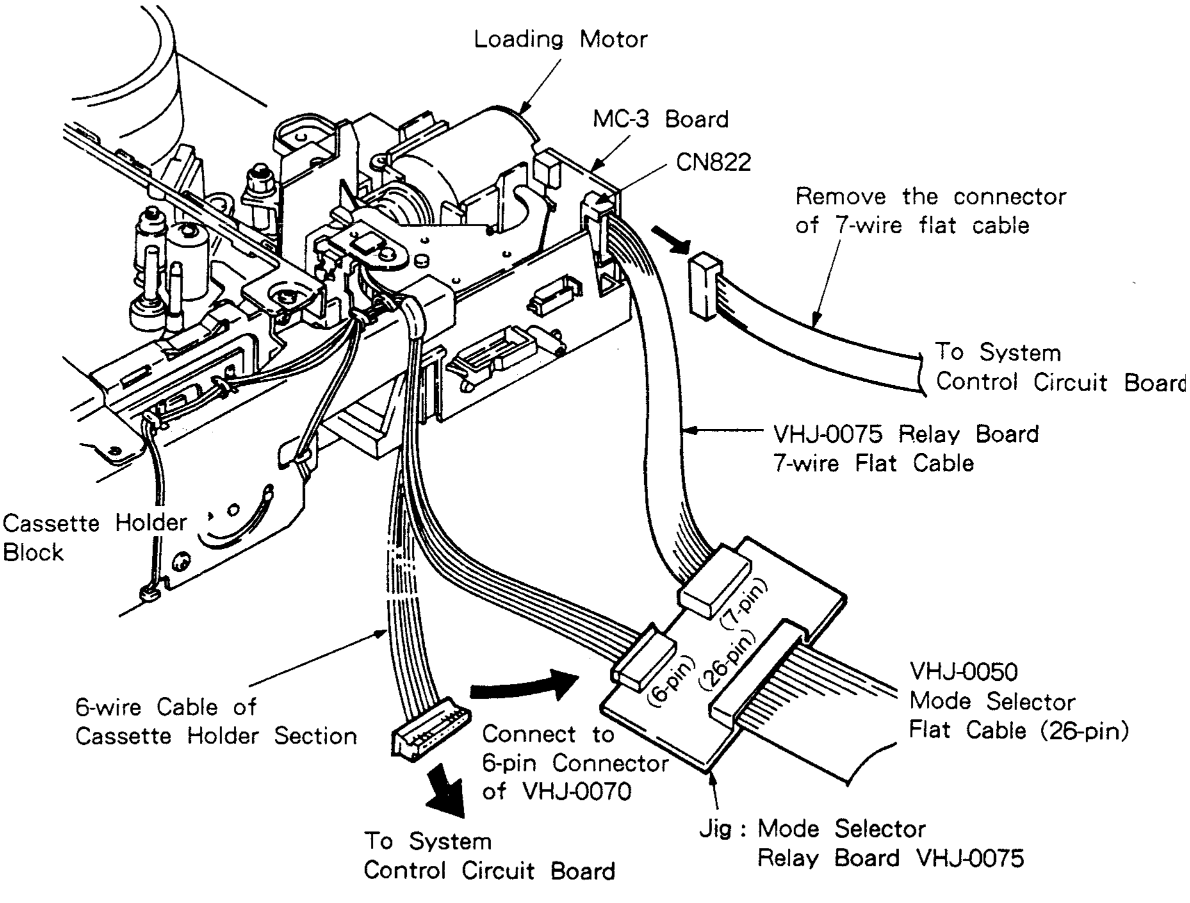

CONNECTION TO THE 26-PIN CONNECTOR OF THE RELAY BOARD (VHJ-0075)
CASE 1
CONTACT SIDE (UPPER)
FLAT-CABLE (26Pin)
MODE SELECTOR VHJ-0050
BLANK/POWER DISPLAY
MECHANISM MODE DISPLAY
NORMAL
SLOW
OFF
POWER SW
←
→
+6V
GND
MODE SELECTION BUTTON
EXT. DC6V. INPUT TERMINAL

Fig. 4-2-1

4-2-2. Connection Method (See Fig. 4-2-2)

1) Remove the 7-wire cable connected from the system control circuit to the connector (CN822) of the MC-3 board.
2) Connect the 7-wire cable (VHJ-0076) between the connector (CN822) of the MC-3 board and the 7-pin connector of the Mode Selector Connection Board (VHJ-0075).
3) Remove the 6-wire cable extending from the cassette holder section from the connector of the System Control Circuit Board and connect it to the 6-pin connector of the Mode Selector Connection Board (VHJ-0075).
4) Connect a supplied 26-pin flat cable (VHJ-0064) of the mode selector (VHJ-0050) between the mode selector body and the 26-pin connector of the Connection Board (VHJ-0075).

Note : Care should be taken to avoid mistaking the direction of the contacting side when connecting a flexible flat cable.



Loading Motor
MC-3 Board
CN822
Remove the connector of 7-wire flat cable
To System Control Circuit Board
VHJ-0075 Relay Board 7-wire Flat Cable
Cassette Holder Block
(7-pin)
(6-pin)
(26-pin)
VHJ-0050 Mode Selector Flat Cable (26-pin)
6-wire Cable of Cassette Holder Section
Connect to 6-pin Connector of VHJ-0070
To System Control Circuit Board
Jig : Mode Selector Relay Board VHJ-0075

Fig. 4-2-2 Connection

4-2-3. Handling Method

1) Keep the right side (⇨) of the mode selector key pressed, and the mode will change in the following sequence : EJECT⇨INITIAL⇨BRAKE⇨STOP/REW/FWD⇨STILL⇨PLAY⇨IDLER⇨REV.
2) When changing the mode in the REV···⇨EJECT direction, press the left side (⇦) of the mode selector key until the desired mode is indicated.
3) In the mid position of each mode during a shift to other mode, the "BLANK" LED lights. But the "PLAY", "IDLER", "REV" LEDs light between the EJECT mode and the INITIAL mode. Be sure therefore to check the mechanism body to see just what state the mechanism is in.
   Incidentally, if the mode selector is not connected to the mechanism, the "BLANK" LED lights to indicate the power ON.
4) The SLOW position of POWER switch makes relatively slow motions in comparison with the NORMAL position.

Note 1 : The mode selector drives the loading motor only, not affecting the head drum motor and the capstan motor. When using the mode selector with a cassette loaded, turn the capstan motor manually to remove tape slackness, preventing tape entanglement.

Note 2 : If the left side (⇦) of the mode selector (VHJ-0050) key is kept pressed with the COMPL cassette mechanism removed, it might get past the EJECT position, causing the front helical gear and the front worm gear to get disengaged.

In this condition, since the front helical gear will not turn even if the right side (⇨) of the mode selector key is pressed, rotate (push) the front helical gear clockwise by hand and engage it with the front worm gear. In this condition, as there is a misalignment between the mechanism main body operation mode (indicated by the mode selector indicator lamps) and the front loading mechanism operation mode, keep the right side (⇨) of the mode selector key pressed until the front helical gear and the front loading gear of the front loading mechanism get back to the initial condition (Refer to A and B in Fig. 4-5-5 of section 4-5-2. Loading Motor).

When the front loading mechanism returns to the initial condition, operation mode of the whole mechanism gets back to normal, matching the mode shown by the mode selector indicator lamps (mode is not properly indicated, however, during EJECT to INITIAL).

Sometimes, engagement of the front helical gear with the front worm gear is delayed, operation mode of the mechanism main body gets too much ahead and the front loading mechanism mode cannot be switched to the initial condition. In that case, press the left side (⇦) of the mode selector key, setting the mechanism main body operation mode back to EJECT (rotation of the mode cam and the MAIN CAM stops).

Note 3 : The mode selector indicator lamps show the mechanism operation mode, but the EJECT lamp may sometimes fail to indicate the actual mechanism operation mode.

5. MECHANISM DISMANTLING AND REASSEMBLING

5-1. MECHANISM MAIN UNIT (See Fig. 5-1-1.)

1. Removal

1) Remove the connectors of the COMPL MC-3 and the COMPL HEAD BRACKET.
2) Remove the flexible cable ① connecting the COMPL CYLINDER to the PRE-AMP UNIT ③ (See Fig. A).
3) Remove the two screws ②, then remove the PRE-AMP UNIT ③.
4) Remove the screw ④, then remove the PRE-AMP. BRACKET ⑤.
5) Remove the two screws ⑥.
6) Remove the three screws ⑦ and two screws ⑩, then lift up the mechanism main unit and remove it.
   Since the TRAY ⑧ obstructs removal of the two front screws ⑩, move the TRAY LOCK LEVER ⑨ in the direction of the arrow to unlock, then slide the TRAY ⑧ before removing the screws. (See Fig. B)

Note : Shape of the PRE-AMP UNIT ③ and the PRE-AMP. BRACKET ⑤ differ depending on the model.

2. Remounting

1) Mount the mechanism main unit onto the chassis with the three screws ⑦ and two screws ⑩.
2) Tighten the two screws ⑥.
3) Mount the PRE-AMP. BRACKET ⑤ with the two screws ④.
4) Mount the PRE-AMP UNIT ③ and the ground lug with the two screws ② (some models are not provided with a ground lug).
5) Insert the flexible cable ① into the connector of the PRE-AMP UNIT.
6) Connect the connectors of COMPL MC-3 and COMPL HEAD BRACKET.

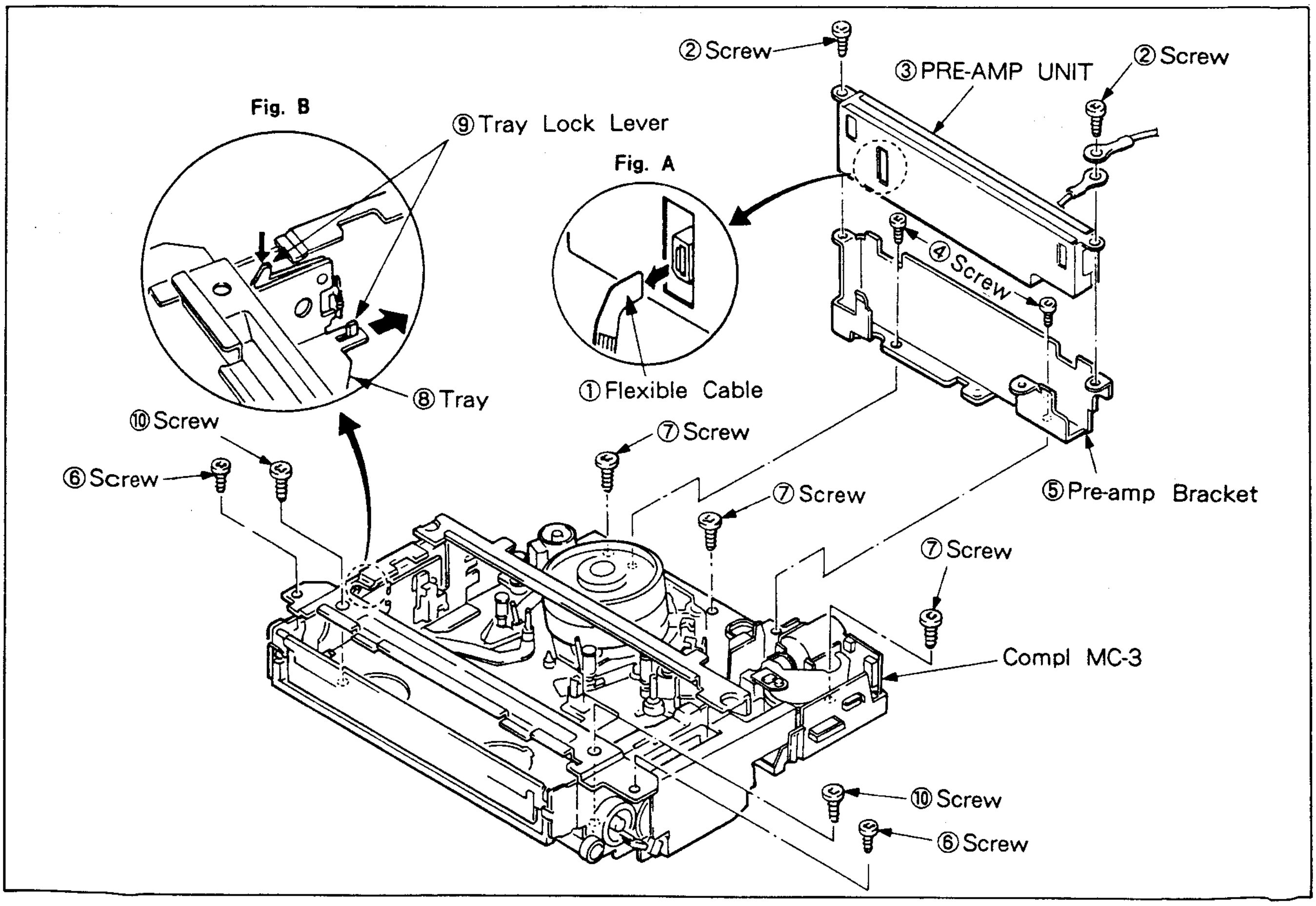

②Screw
③PRE-AMP UNIT
②Screw
Fig. B
⑨Tray Lock Lever
Fig. A
④Screw
⑧Tray
①Flexible Cable
⑩Screw
⑦Screw
⑥Screw
⑦Screw
⑤Pre-amp Bracket
⑦Screw
Compl MC-3
⑩Screw
⑥Screw

Fig. 5-1-1 Mecahnism Main Unit

5-2. CASSETTE HOLDER MECHANISM

5-2-1. COMPL Cassette Mechanism (See Fig. 5-2-1.)

1. Removal

1) Set the video main unit to the EJECT completed mode.
2) Pull out the connectors (6-PIN CONNECTOR connected to the system control circuit board, ACE HEAD CONNECTOR, and FTE HEAD CONNECTOR) from CASSETTE HOLDER.
3) Remove the two screws ①.
4) Remove the two screws ②.
5) Lift up the COMPL CASSETTE MECHANISM ④ back a little and remove the two hooks ③ on the front (See Fig. B). When doing so, make sure that the SAFETY SWITCH LEVER is not caught by the mechanism chassis.

2. Remounting

1) Set the chassis section mechanism to the EJECT mode with the mode selector (VHJ-0050) (looking from above, match the front loading gear hole ⑤ with the MOTOR HOLDER hole ⑥ as shown in Fig. A).
2) Set the COMPL CASSETTE MECHANISM ④ to the EJECT completed mode.
3) Mount the COMPL CASSETTE MECHANISM ④ onto the mechanism chassis, aligning it with the protuberance.
   Match positions of the FRONT LOADING GEAR △ mark ⑦ and the RACK EJECT mark ⑧. (See Fig. A.)
4) Fix to the mechanism chassis with the two screws ②.
5) Fix to the chassis with the screw ①.
6) Connect to the various connectors.

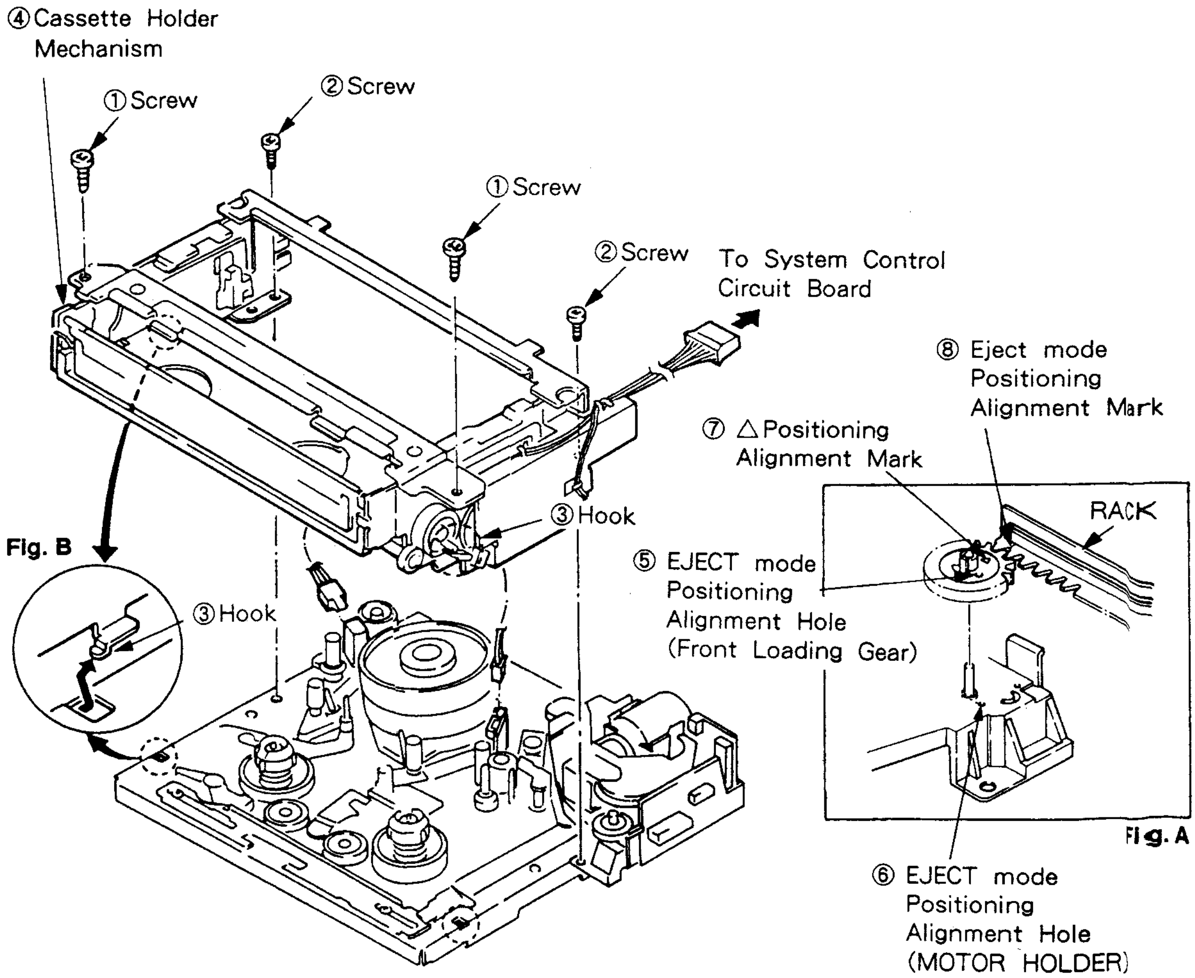

④Cassette Holder Mechanism
①Screw
②Screw
①Screw
②Screw
To System Control Circuit Board
⑧ Eject mode Positioning Alignment Mark
⑦ △Positioning Alignment Mark
RACK
③Hook
Fig. B
③Hook
⑤ EJECT mode Positioning Alignment Hole (Front Loading Gear)
Fig. A
⑥ EJECT mode Positioning Alignment Hole (MOTOR HOLDER)

Fig. 5-2-1 Compl Cassette Mechanism

5-2-2. Gear Bracket Ass'y (See Fig. 5-2-2.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the four screws ①, then remove the GEAR BRACKET ASS'Y ②.
3) Remove the E ring ③, then remove the LOCK GEAR ④, the PINION LEVER ASS'Y ⑤, the PINION GEAR ⑥ and the RACK ⑦, in that order.

2. Remounting

1) Apply grease to the shaft ⑧ and the two pins ⑨ of the GEAR BRACKET ASS'Y.
2) Apply grease to the pin ⑩ of the PINION LEVER ASS'Y.
3) Apply grease to the toothed part of the RACK ⑦.
4) Fit the RACK ⑦ onto the two pins ⑨. Match position of the hole ⑪ to the GEAR BRACKET hole ⑫.
5) Mount the PINION GEAR ⑥, PINION LEVER ASS'Y ⑤, and LOCK GEAR ④ in the shaft ⑧ in the order mentioned.
   Set the hole ⑬ of the PINION GEAR and the LOCK GEAR with the hole ⑪ of the RACK for proper positioning at that time.
6) Mount them in E-ring shaft.
7) Set the GEAR BRACKET ASS'Y ② to the dowel and mount it using four screws ①.
   Set the hole Ⓐ of the IDLER GEAR with the hole Ⓑ of the SIDE BOARD as shown in Fig. 5-2-3 at this time.
   Also set the hole ⑬ of the PINION GEAR and the LOCK GEAR with the hole ⑫ of the GEAR BRACKET by referring to Fig. 5-2-2. After mounting them, check to be sure that FL START SWITCH ⑭ is in the ON state shown in Fig. A.
8) Remount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.

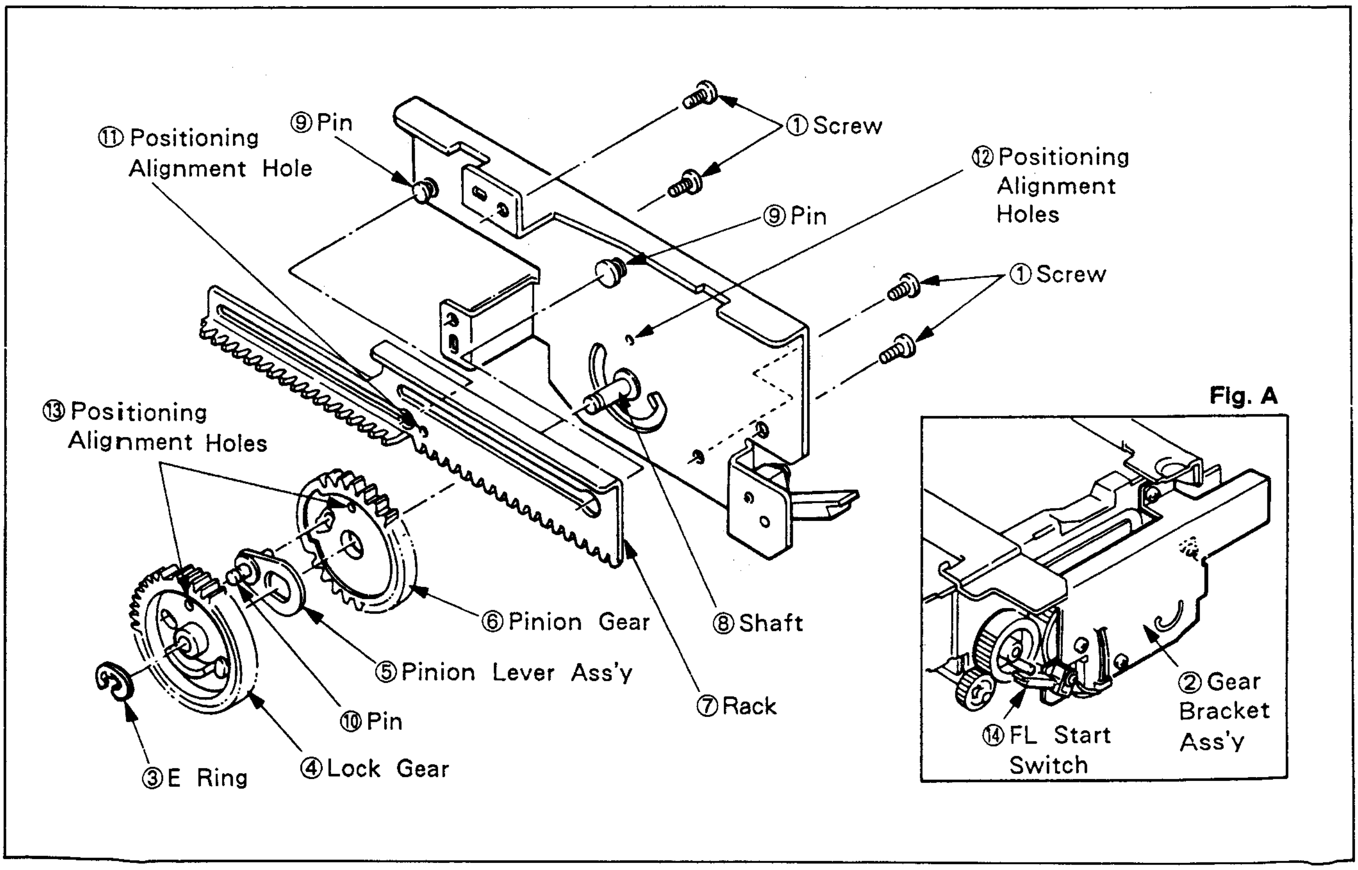

⑪ Positioning Alignment Hole
⑨ Pin
① Screw
⑫ Positioning Alignment Holes
⑨ Pin
① Screw
⑬ Positioning Alignment Holes
⑥ Pinion Gear
⑧ Shaft
⑤ Pinion Lever Ass'y
⑦ Rack
⑩ Pin
③ E Ring
④ Lock Gear
Fig. A
② Gear Bracket Ass'y
⑭ FL Start Switch

Fig. 5-2-2. Gear Bracket Ass'y

5-2-3. Cassette Drive Gear (Right) (See Fig. 5-2-3.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM and the GEAR BRACKET ASS'Y as instructed in 5-2-1. and 5-2-2., respectively.
2) Remove the IDLER GEAR ①.
3) Remove the SPRING COIL ②, then remove the MAIN GEAR ③.
4) Remove the E ring ④, then remove the LEVER GEAR ASS'Y R ⑤.
5) Open the hook ⑥ and remove the COUPLE GEAR R ⑦. Take care not to open the hook ⑥ too much, otherwise it may get deformed or broken. If it does, replace it.
6) Remove the IDLER GEAR R ⑧.

2. Remounting

1) Apply grease to gear parts that undergo friction.
2) Mount the IDLER GEAR R ⑧ onto the axle ⑨.
3) Mount the COUPLE GEAR R ⑦ onto the ROD ASS'Y axle ⑩. When doing so, match the couple gear position with the IDLER GEAR R ⑧ as shown in Fig. A.
4) Mount the LEVER GEAR ASS'Y R ⑤ onto the axles ⑪ and ⑫. Match position to the IDLER GEAR R ⑧ as shown in Fig. A.
5) Mount the E ring ④ onto the axle ⑫.
6) Mount the MAIN GEAR ③ onto the axle ⑪. When doing so, match position to the IDLER GEAR R ⑧ as shown in Fig. A.
7) Hook the SPRING COIL ② to the notch ⑬ in the MAIN GEAR R ③ and the LEVER GEAR ASS'Y R.
8) Mount the IDLER GEAR ① onto the axle ⑭. When doing so, match position to the MAIN GEAR as shown in Fig. A.
9) Mount the GEAR BRACKET ASS'Y and the COMPL CASSETTE MECHANISM ASS'Y as instructed in 5-2-2. and 5-2-1., respectively.

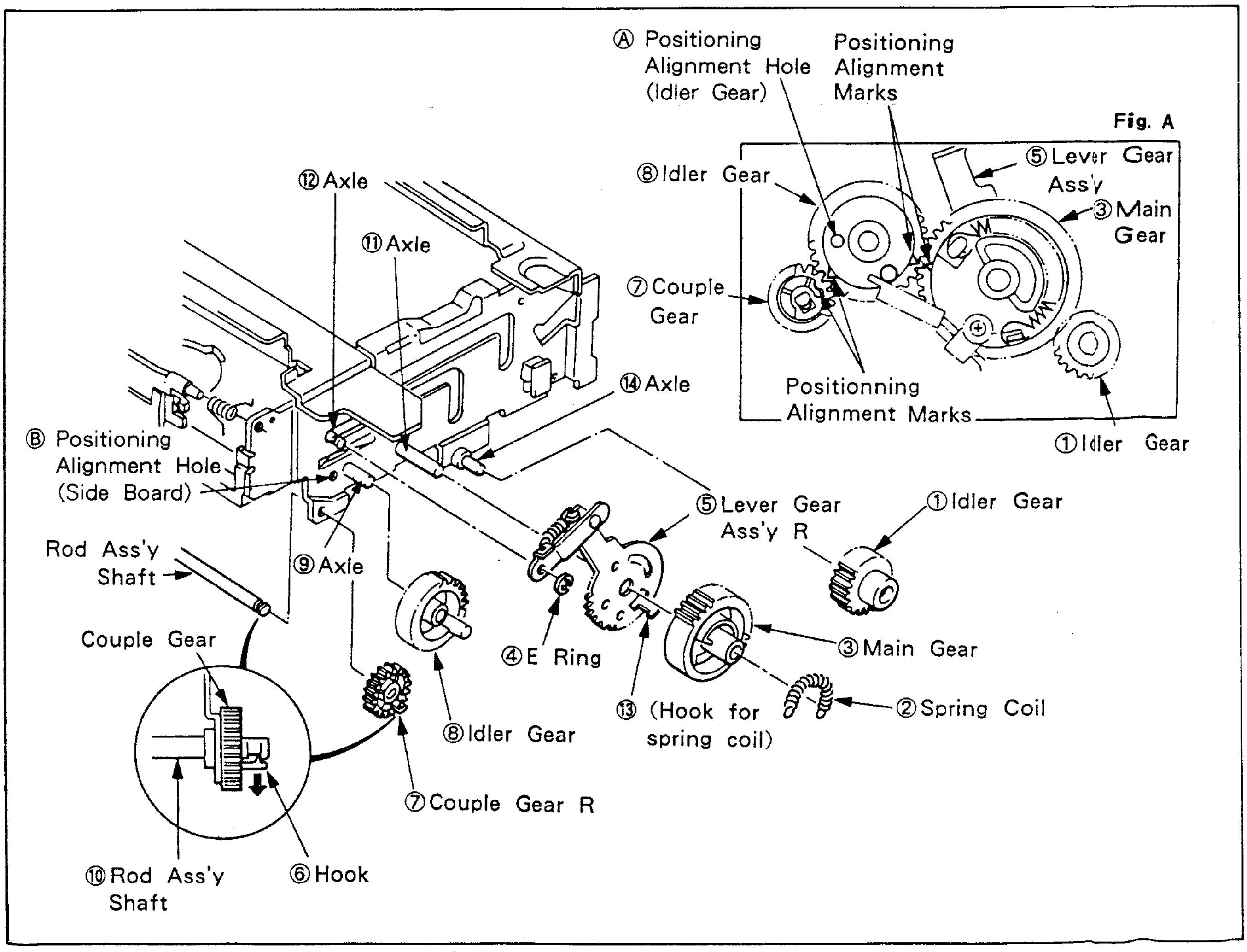

Ⓐ Positioning Alignment Hole (Idler Gear)
Positioning Alignment Marks
Fig. A
⑤Lever Gear Ass'y
③Main Gear
⑧Idler Gear
⑦Couple Gear
⑭Axle
Positionning Alignment Marks
①Idler Gear
⑫Axle
⑪Axle
Ⓑ Positioning Alignment Hole (Side Board)
Rod Ass'y Shaft
⑨Axle
Couple Gear
⑤Lever Gear Ass'y R
①Idler Gear
③Main Gear
④E Ring
⑧Idler Gear
⑬ (Hook for spring coil)
②Spring Coil
⑦Couple Gear R
⑩Rod Ass'y Shaft
⑥Hook

Fig. 5-2-3. Cassette Drive Gears (Right Side)

5-2-4. Cassette Drive Gear (Left) (See Fig. 5-2-4)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the COUPLE GEAR R as instructed in 5-2-3.
3) Remove the ROD ASS'Y ①.
4) Remove the E ring ②.
5) Remove the hook ③, then remove the LEVER GEAR ASS'Y L ④. Take care not to open the hook ③ too much, otherwise it may get deformed or broken. If it does, replace it.
6) Remove the SPRING COIL ⑤ from the LEVER GEAR ASS'Y ④.
7) Remove the IDLER GEAR L ⑥ and the DOOR OPEN LEVER ⑦.

2. Remounting

1) Apply grease to the axles ⑧, ⑨ and ⑩.
2) Apply grease to the IDLER GEAR L ⑥.
3) Mount the DOOR OPEN LEVER ⑦ onto the axle ⑧. Do it so that the end of the DOOR OPEN LEVER ⑦ leans against the front side of the CASSETTE DOOR ⑪ as shown in Fig. A.
4) Mount the IDLER GEAR L ⑥ onto the axle ⑧.
5) Pass the ROD ASS'Y ① through the hole ⑫. Match position of the COUPLE GEAR L ⑬ and the IDLER GEAR L ⑥ as shown in Fig B.
6) Mount the COUPLE GEAR R as instructed in 5-2-3.
7) Hook the SPRING COIL ⑤ to the LEVER GEAR ASS'Y L ④.
8) Mount the LEVER GEAR ASS'Y L ④ onto the axle ⑨ and the shaft ⑩. Match position to the IDLER GEAR L ⑥ as shown in Fig. B.
9) Mount the COMPL CASSETTE MECHANISM onto the chassis as instructed in 5-2-1.

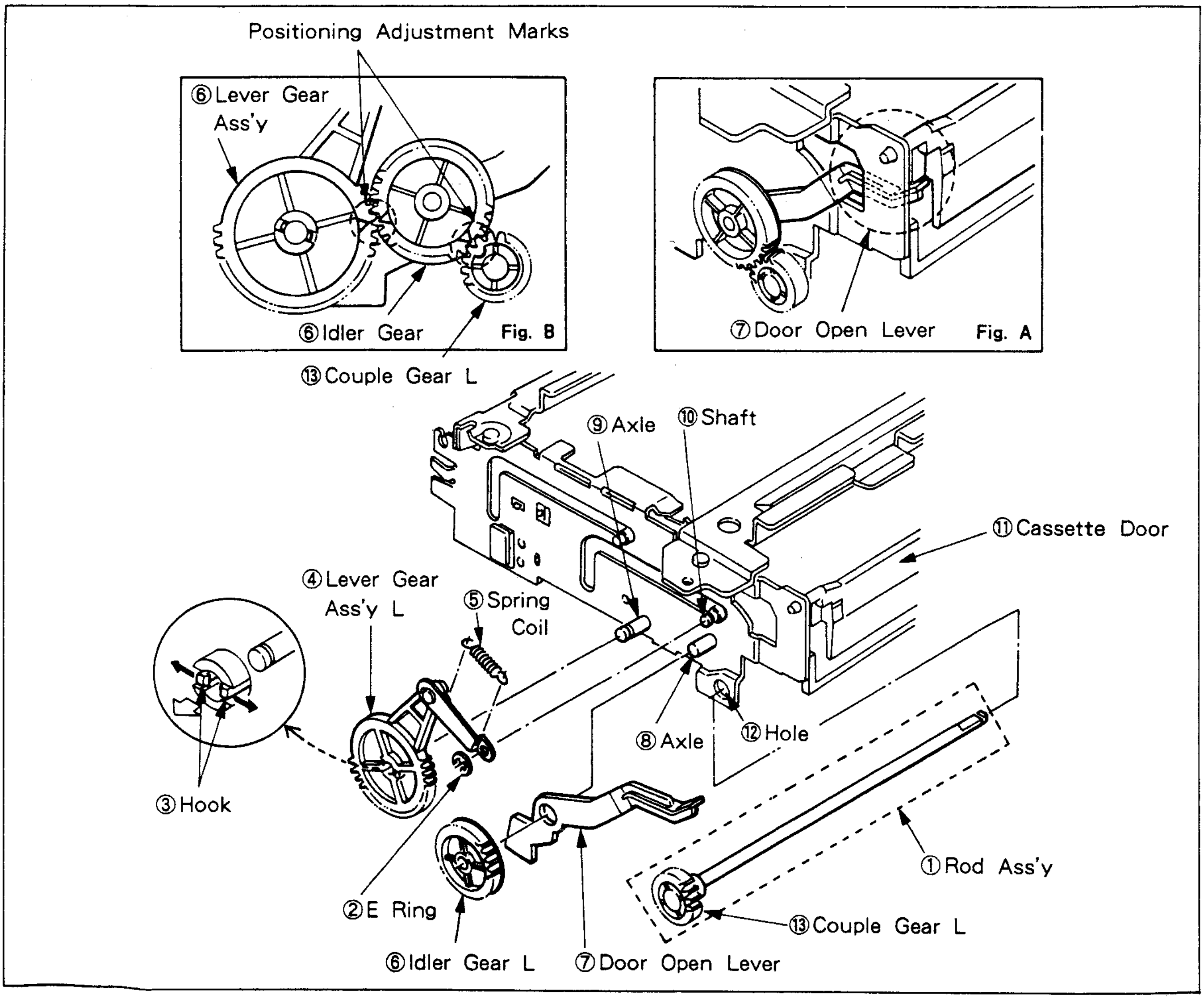

Positioning Adjustment Marks
⑥Lever Gear Ass'y
⑥Idler Gear
Fig. B
⑬Couple Gear L
⑦Door Open Lever
Fig. A
⑨Axle
⑩Shaft
⑪Cassette Door
④Lever Gear Ass'y L
⑤Spring Coil
⑧Axle
⑫Hole
③Hook
①Rod Ass'y
⑬Couple Gear L
②E Ring
⑥Idler Gear L
⑦Door Open Lever

Fig. 5-2-4. Cassette Drive Gears (Left Side)

5-2-5. FL Start Switch (See Fig. 5-2-5.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the screw ①.
3) Remove the lead wire of the FL START SWITCH ②.

2. Remounting

1) Solder the lead wire to the FL START SWITCH ② terminal.
2) Align the FL START SWITCH ② protuberance to the hole ⑤, then mount it onto the GEAR BRACKET ASS'Y ③ with the screw ①. Do it so that the FL START SWITCH ② is turned ON by holding the pin ④ of IDLER GEAR in the EJECT completed mode.
3) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.

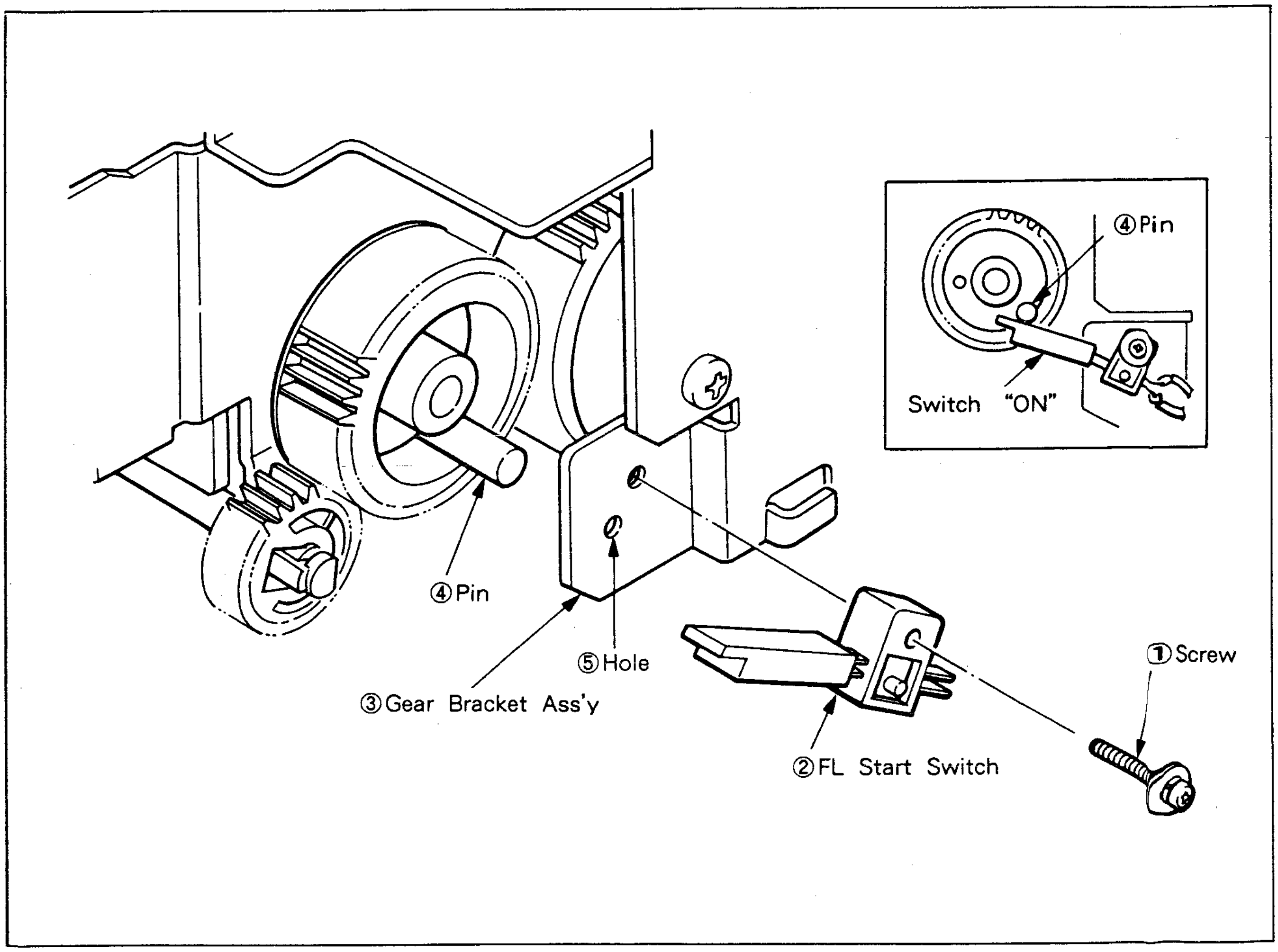

④Pin
Switch "ON"
④Pin
⑤Hole
③Gear Bracket Ass'y
①Screw
②FL Start Switch

Fig. 5-2-5. FL Start Switch

5-2-6. T-Top Sensor, T-End Sensor (See Fig. 5-2-6.)

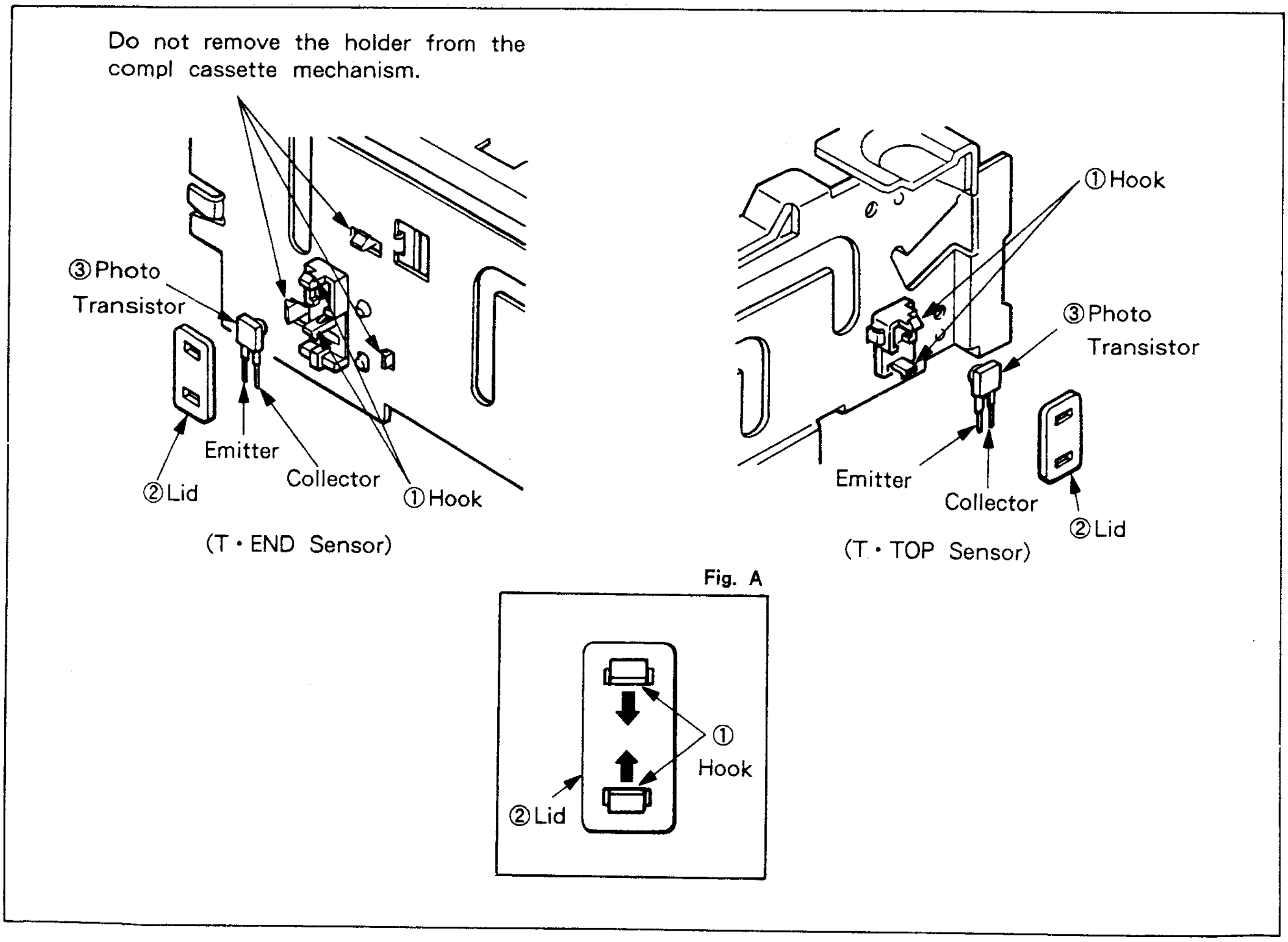
1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) When removing the T-TOP SENSOR, remove the GEAR BRACKET ASS'Y as instructed in 5-2-2.
3) Unhook the hook ① as instructed in Fig. A, then remove the LID ②. Take care not to push the hook ① too much, otherwise it may be deformed or broken.
4) Remove the phototransistors ③, then remove the lead wire.

Note : Mounting position of the transistor holder on the T-END SENSOR side is precisely adjusted at the factory, so do never remove it from the COMPL CASSETTE MECHANISM.

2. Remounting

1) Solder the brown lead wire to the emitter side, and the red lead wire to the collector side of the T-TOP SENSOR phototransistor ③.
   Solder the orange lead wire to the emitter side, and the yellow lead wire to the collector side of the T-END SENSOR phototransistor.
2) Mount the phototransistors ③ onto their respective holders.
3) Mount the LID ② and fix it with the hook ①.
4) Mount the GEAR BRACKET ASS'Y as instructed in 5-2-2.
5) Mount the COMPL CASSETTE MECHANISM as insturcted in 5-2-1.



Do not remove the holder from the compl cassette mechanism.

③Photo Transistor
Emitter
Collector
②Lid
①Hook
(T • END Sensor)
①Hook
③Photo Transistor
Emitter
Collector
②Lid
(T • TOP Sensor)
Fig. A
①
Hook
②Lid

Fig. 5-2-6. T TOP Sensor & T END Sensor

5-3. COMPL HOLDER MOTOR (LOADING MOTOR BLOCK)

5-3-1. COMPL Motor Bracket

1. Removal

1) Remove the PRE-AMP UNIT and the PRE-AMP. BRACKET as instructed in 5-1.
2) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
3) Remove the two screws ① and the other one ⑩, then remove the COMPL HOLDER MOTOR ② (see Fig. 5-3-1.).

2. Remounting

1) Set the mechanism chassis to the INITIAL mode. In this mode, look at the mechanism chassis positioning holes ③ just from above and align the MAIN CAM ④ and MODE CAM ⑤ positioning holes as shown in Fig. A.
2) Set the COMPL HOLDER MOTOR ② to the INITIAIL mode with the mode selector (VHJ-0050). In this position, the FRONT LOADING GEAR △ mark ⑥ is aligned with the MOTOR HOLDER INITIAL mode position mark ⑦ (see Fig. B.).
3) Align the ROTARY SWITCH (mode detector switch) ⑧ with the INITIAL mode position mark ⑨ (see Fig. C.).
4) Align the COMPL HOLDER MOTOR main unit ② with the protuberance ⑪, then mount it with the two screws ① and the other one ⑩.
5) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
6) Mount the PRE-AMP UNIT and the PRE-AMP. BRACKET as instructed in 5-1.

Note : Normal mechanism operation cannot be achieved if initial positioning of the MAIN CAM ④, the MODE CAM ⑤ and the ROTARY SWITCH (mode detector switch) ⑧ are not performed precisely.

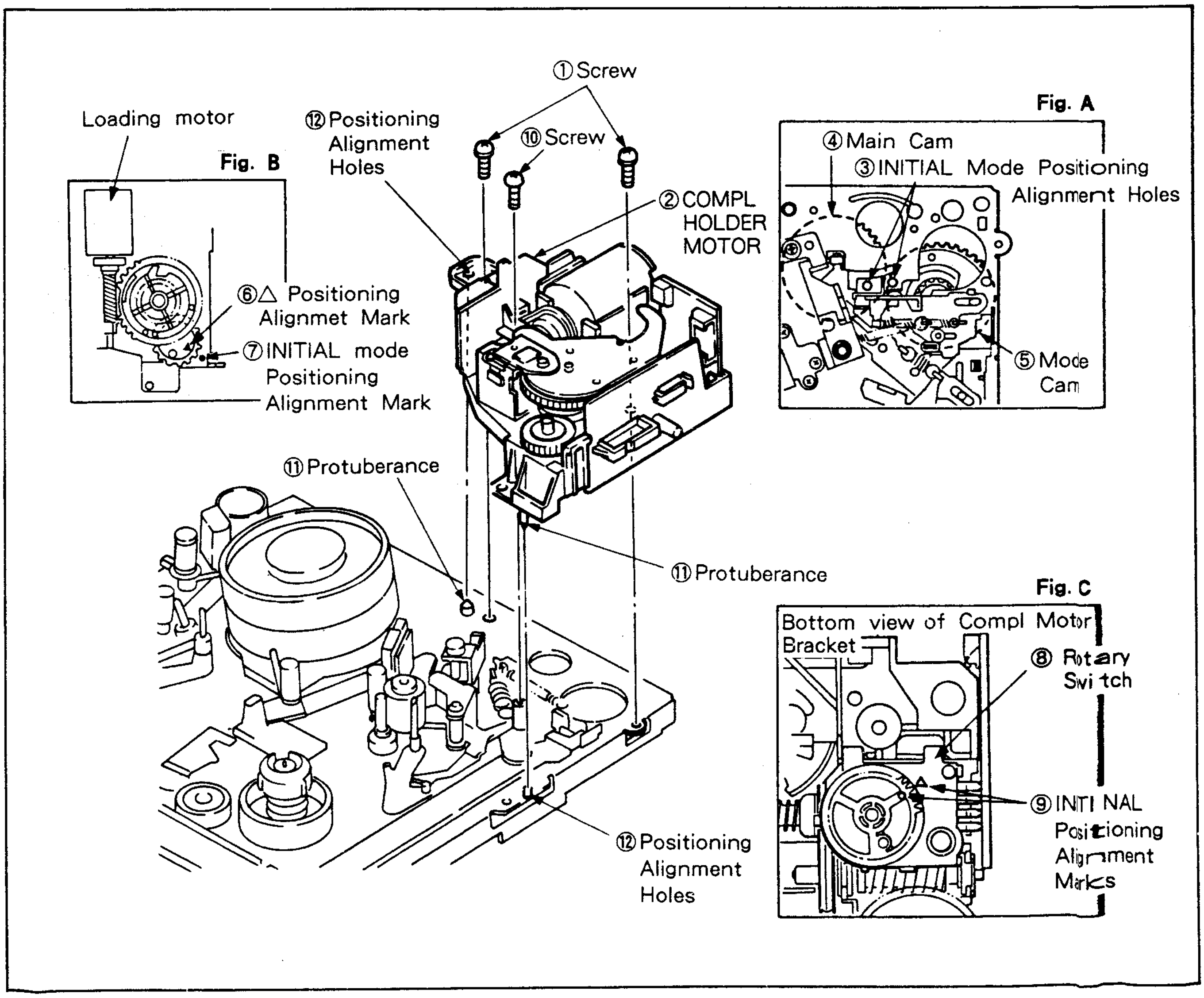

①Screw
Loading motor
⑫Positioning Alignment Holes
⑩Screw
Fig. B
②COMPL HOLDER MOTOR
Fig. A
④Main Cam
③INITIAL Mode Positioning Alignment Holes
⑥△ Positioning Alignmet Mark
⑦INITIAL mode Positioning Alignment Mark
⑤Mode Cam
⑪Protuberance
⑪Protuberance
Fig. C
Bottom view of Compl Motor Bracket
⑧ Rotary Switch
⑨INITI NAL Positioning Alignment Marks
⑫Positioning Alignment Holes

Fig. 5-3-1 Compl Holder Motor

5-3-2. Loading Motor (Refer to Fig. 5-3-2.)

1. Removal

LOADING MOTOR can be replaced after LOADING MOTOR BLOCK unit has been removed by referring to 5-3-1. The 1990 version of the mechanism allows LOADING MOTOR itself to be replaced without removing CASSETTE HOLDER BLOCK and LOADING MOTOR BLOCK. The following describes this procedure.

1) Use MODE SELECTOR (VHJ-0050) to set the mechanism to the initial mode.
2) Remove the connector for DEW SENSOR connected to the MC-3 board ①.
3) Remove three screws ② and remove HOLDER BRACKET ④ with FRONT WORM ASS'Y ③ still attached.
4) Remove DAMPER ⑥ attached to the pulley of LOADING MOTOR ⑤.
5) Remove FRONT HELICAL GEAR ⑦ and WASHER ⑧.
6) Remove soldered LEAD WIRE from the terminal of LOADING MOTOR ⑤.
7) Remove LOADING BELT ⑨.
8) Remove LOADING MOTOR ⑤ by lifting up from the back terminal side.

2. Remounting

Before attaching LOADING MOTOR ⑤ to MOTOR BRACKET ASS'Y ⑩, confirm DAMPER ⑪ and DAMPER ⑫ shown in Fig. 5-3-5. are in the proper position on MOTOR BRACKET ASS'Y ⑩.

1) LOADING MOTOR ⑤ puts REAR SIDE BOSS ㉓ in the slit ㉔ of MOTOR HOLDER ⑩.
   Further, mount the tap hole ⑬ at two points of the front pulley side so that the it is secured to the PROTUBERANCE ⑭ of the MOTOR HOLDER at two points.
2) Solder the lead wire from the MC-3 board to LOADING MOTOR ⑤ terminal. (Solder the red lead wire to the positive terminal side.)
3) Hang LOADING BELT ⑨ on the pulley.
4) After hanging BELT ⑨ on the pulley, confirm that the mechanism unit is in the initial mode. The initial mode is indicated by Fig. A of Fig. 5-3-2., and is the position in which INITIAL POSITIONING ALIGNMENT HOLEs of MAIN CAM ⑮ and MODE CAM ⑯ are lined up with THROUGH HOLE ⑰ of MOTOR HOLDER. If the initial mode is not selected, adjust with MODE SELECTOR (VHJ-0050).
5) As shown in Fig. B, confirm the positions of the △ POSITIONING ALIGNMENT MARK on FRONT LOAD GEAR ⑱ and INITIAL MARK ⑲ position of MOTOR HOLDER and the position relationship of CASSETTE HOLDER RACK ⑳.
6) Apply a light coat of grease to the entire sides of AXLE ㉑ and FRONT HELICAL GEAR ⑦.
7) Attach FRONT HELICAL GEAR ⑦ and WASHER ⑧ to AXLE ㉑. As shown in Fig. C, FRONT HELICAL GEAR ⑦ is attached so that the indent on the side is inside PIN ㉒ of FRONT LEVER ASS'Y.
8) Attach DAMPER ⑥ to LOADING MOTOR ⑤ pulley.
9) HOLDER BRACKET ④ is attached by engaging FRONT WORM ASS'Y ③ with LOADING MOTOR ⑤ pulley, and held in place with three screws ②.
10) Attach the connector of DEW SENSOR ㉕ to the MC-3 board ① and return the mechanism to the eject completion using MODE SELECTOR.

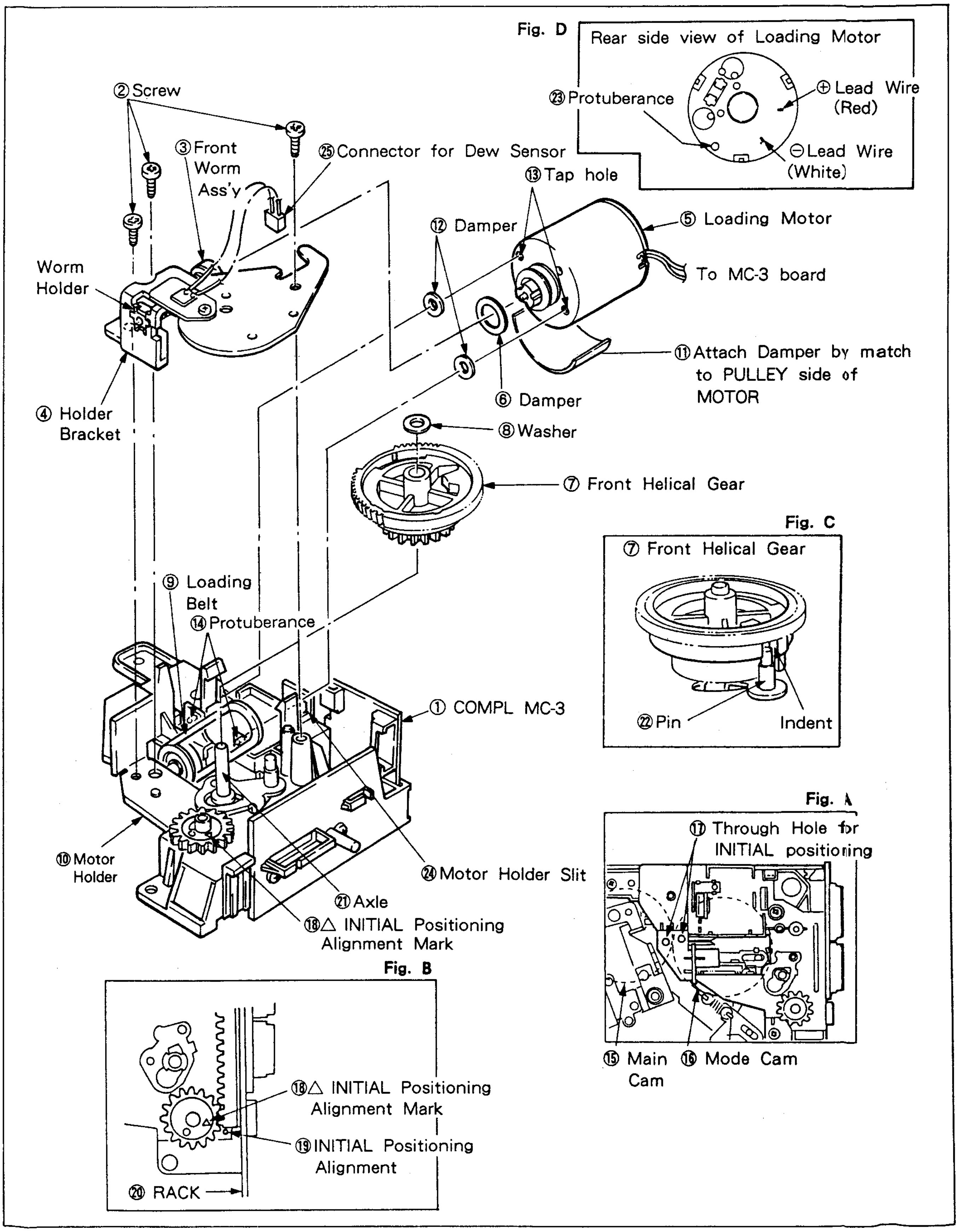


Fig. D
Rear side view of Loading Motor
㉓ Protuberance
⊕ Lead Wire (Red)
⊖ Lead Wire (White)
② Screw
③ Front Worm Ass'y
㉕ Connector for Dew Sensor
⑬ Tap hole
⑫ Damper
⑤ Loading Motor
To MC-3 board
Worm Holder
⑪ Attach Damper by match to PULLEY side of MOTOR
④ Holder Bracket
⑥ Damper
⑧ Washer
⑦ Front Helical Gear
Fig. C
⑦ Front Helical Gear
㉒ Pin
Indent
⑨ Loading Belt
⑭ Protuberance
① COMPL MC-3
⑩ Motor Holder
㉔ Motor Holder Slit
㉑ Axle
⑱△ INITIAL Positioning Alignment Mark
Fig. A
⑰ Through Hole for INITIAL positioning
⑮ Main Cam
⑯ Mode Cam
Fig. B
⑱△ INITIAL Positioning Alignment Mark
⑲ INITIAL Positioning Alignment
⑳ RACK

Fig. 5-3-2. Loading Motor

5-4. TAPE LOADING MECHANISM

5-4-1. Main Parts of the Tape Loading Mechanism (See Fig. 5-4-1.)

1. Removal

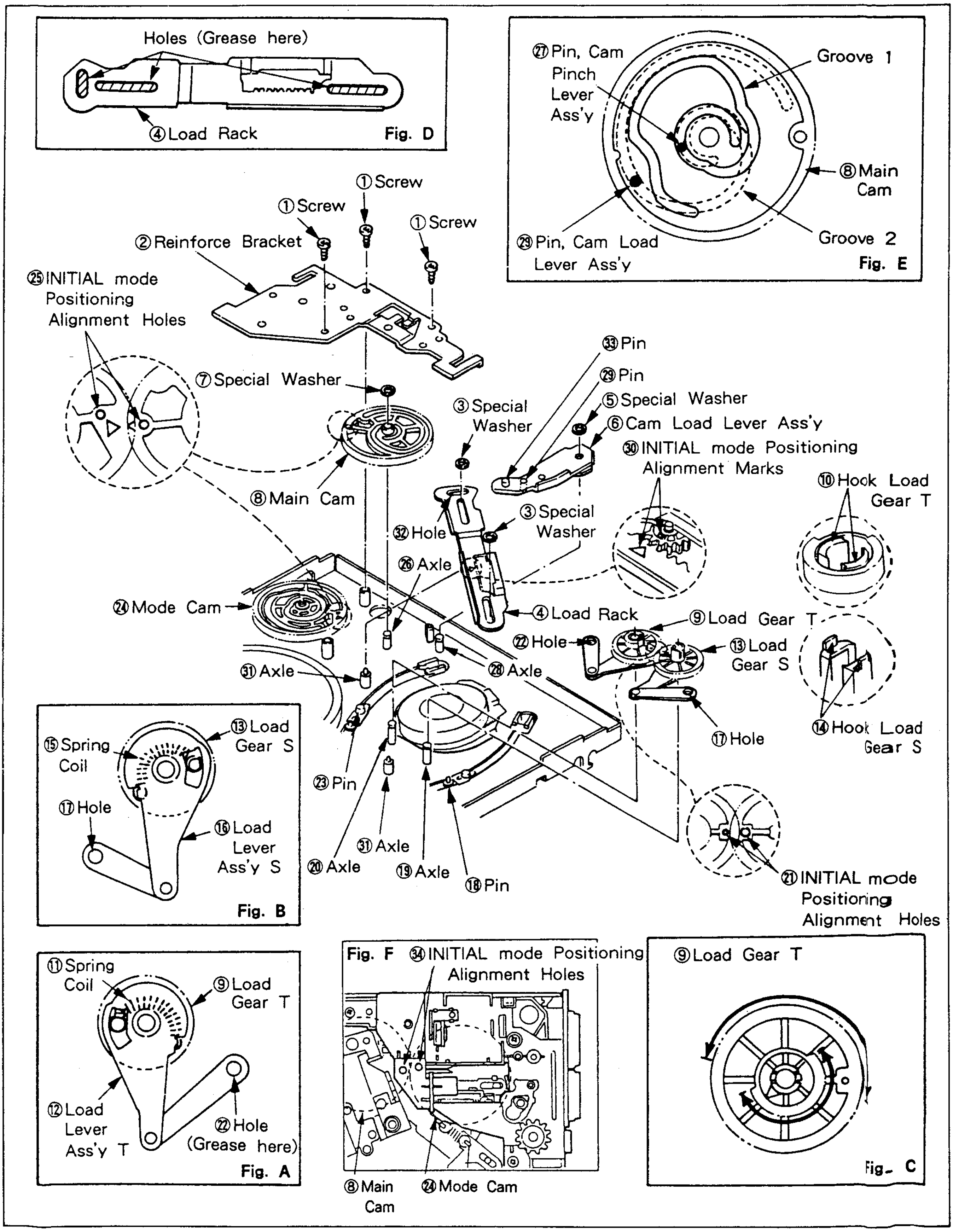
1) Remove connectors from the DRUM MOTOR board (SV-5).
2) Remove the three screws ①, then remove the REINFORCE BRACKET ②.
3) Remove the two special washers ③, then remove the LOAD RACK ④.
4) Remove the special washer ⑤, then remove the CAM LOAD LEVER ASS'Y ⑥.
5) Remove the stop washer ⑦, then remove the MAIN CAM ⑧.
6) Unhook the LOAD GEAR T hook ⑩, then remove the LOAD GEAR T ⑨ as shown in Fig. A, with the SPRING COIL ⑪ and the LOAD LEVER ASS'Y T ⑫ attached to it.
7) Unhook the LOAD GEAR S hook ⑭, then remove the LOAD GEAR S ⑬ as shown in Fig. B, with the SPRING COIL S ⑮ and the LOAD LEVER ASS'Y S ⑯ attached to it.

Note : Take care not to open the LOAD GEAR hooks too much, otherwise they may be deformed or broken. If they are, replace them.

2. Remounting

1) Apply grease to the inner surface of the LOAD LEVER ASS'Y S ⑯ hole ⑰, as shown in Fig. B.
2) Apply grease to the inner surface of the LOAD LEVER ASS'Y T ⑫ hole ㉒ and to the section of the LOAD GEAR T ⑨ indicated with an arrow in Fig. C.
3) Apply grease to GROOVEs 1 and 2 of the MAIN CAM ⑧, and to the outer side of the teeth.
4) Apply grease to the three oval holes of the LOAD RACK ④ as shown in Fig. D.
5) Apply grease to the outer surface of axles ⑲ ⑳㉖ and ㉘.
6) After assembling as shown in Fig. B, mount the LOAD GEAR S ⑬ onto the axle ⑲. Insert the ROLLER BASE S pin ⑱ into the LOAD LEVER ASS'Y S hole ⑰.
7) After assembling as shown in Fig. A, mount the LOAD GEAR T ⑨ onto the axle ⑳. When doing so, set the LOAD GEAR S ⑬ and the LOAD GEAR T ⑨ to the INITIAL mode position ㉑. Insert the ROLLER BASE T pin ㉓ into the hole ㉒ of the LOAD LEVER ASS'Y T ⑫.
8) Mount the MAIN CAM ⑧ on the axle ㉖. At that time, make sure that the positioning hole ㉕ of the MAIN CAM ⑧ and the MODE CAM ㉔ matches the initial positioning hole ㉞ of the MECHANISM CHASSIS. Also check to be sure that the Pin ㉗ of the CAM PINCH LEVER ASSEMBLY is put in the groove ① of the MAIN CAM as shown in Fig. E.
9) Mount the special washer ⑦ to the axle ㉖.
10) Mount the CAM LOAD LEVER ASS'Y ⑥ onto the axle ㉘. Insert the pin ㉙ into the MAIN CAM GROOVE 2 as shown in Fig. E.
11) Mount the special washer ⑤ onto the axle ㉘.
12) Set the LOAD RACK ④ to the INITIAL mode position ㉚ with the LOAD GEAR T ⑨, and mount onto the two axles ㉛. Insert the CAM LOAD LEVER ASS'Y pin ㉝ into the hole ㉜.
13) Mount the two special washers ③ onto the two axles ㉛.
14) Mount the REINFORCE BRACKET ② with the three screws ①.
15) Insert the connector into the DRUM MOTOR board (SV-5).
16) Confirm that loading and unloading are performed smoothly.

Note : Be sure to perform INITIAL mode positioning of cams and gears precisely.



Holes (Grease here)
④Load Rack
Fig. D
㉗Pin, Cam Pinch Lever Ass'y
Groove 1
⑧Main Cam
㉙Pin, Cam Load Lever Ass'y
Groove 2
Fig. E
①Screw
①Screw
①Screw
②Reinforce Bracket
㉕INITIAL mode Positioning Alignment Holes
⑦Special Washer
⑧Main Cam
③Special Washer
㉝Pin
㉙Pin
⑤Special Washer
⑥Cam Load Lever Ass'y
㉚INITIAL mode Positioning Alignment Marks
⑩Hook Load Gear T
㉜Hole
③Special Washer
㉖Axle
㉔Mode Cam
④Load Rack
⑨Load Gear T
㉒Hole
⑬Load Gear S
㉛Axle
㉘Axle
⑰Hole
⑭Hook Load Gear S
⑮Spring Coil
⑬Load Gear S
⑰Hole
⑯Load Lever Ass'y S
Fig. B
㉓Pin
㉛Axle
⑳Axle
⑲Axle
⑱Pin
㉑INITIAL mode Positioning Alignment Holes
⑪Spring Coil
⑨Load Gear T
⑫Load Lever Ass'y T
㉒Hole (Grease here)
Fig. A
Fig. F
㉞INITIAL mode Positioning Alignment Holes
⑧Main Cam
㉔Mode Cam
⑨Load Gear T
Fig. C

5-4-1. Loading Mechanism Main Parts

5-4-2. Mode Cam (See Fig. 5-4-2.)

1. Removal

1) Set the INITIAL mode with the mode selector (VHJ-0050).
2) Remove the REINFORCE BRACKET as instructed in 5-4-1.
3) Remove the two stop washers ①, then remove the CAM PLATE SLIDE ASS'Y ②.
4) Remove the MODE CAM ③.

2. Remounting

1) Referring to 5-4-1., confirm that the MAIN CAM is in the INITIAL mode position.
2) In case the MAIN CAM is misplaced, use the mode selector (VHJ-0050) to align the MAIN CAM positioning hole with the chassis INITIAL mode position hole (refer to 5-4-1. for the INITIAL mode position). Since the ROTARY SWITCH (mode detector switch) does not rotate, the mode selector indicator lamp will not show the correct mode.
3) Align the ROTARY SWITCH (mode detector switch) ④ with the INITIAL mode position mark ⑤ as shown in Fig. A.
4) Mount the MODE CAM ③ onto the axle ⑥. Do it so that the SLIDE CAM ASS'Y pin ⑪ is placed in the GROOVE 3 as shown in Fig. B.
5) Mount the CAM PLATE SLIDE ASS'Y ② onto the axles ⑥ and ⑦. Do it so that the pin ⑧ gets into the GROOVE 4 of the MODE CAM as shown in Fig. B, and the point ⑨ of the bent-up part into the ACT PLATE SLIDE ASS'Y hole ⑩.
6) Mount the two special washers ① onto the axles ⑥ and ⑦.
7) Mount the REINFORCE BRACKET as instructed in 5-4-1.

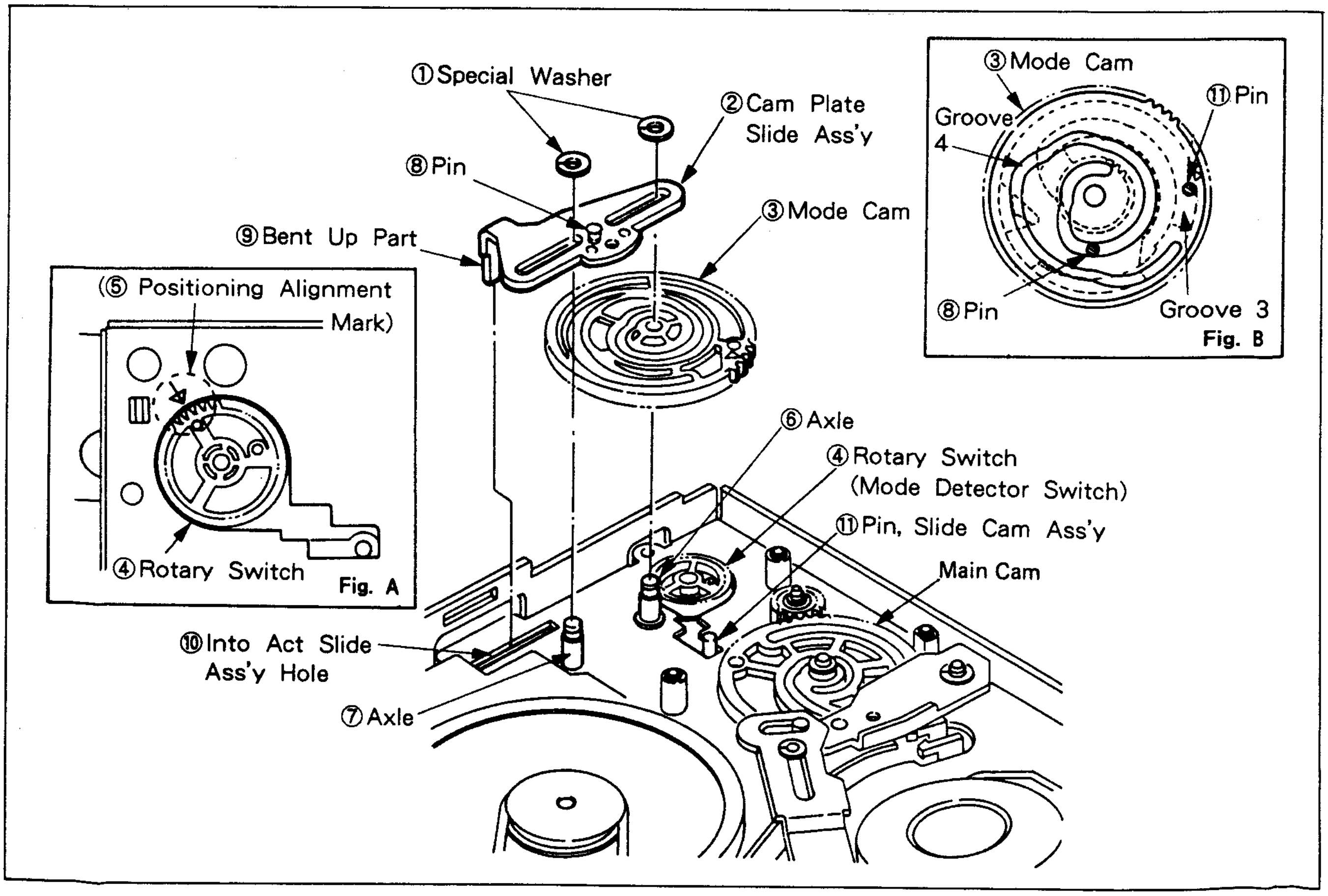

①Special Washer
②Cam Plate Slide Ass'y
⑧Pin
③Mode Cam
⑨Bent Up Part
(⑤ Positioning Alignment Mark)
④Rotary Switch
Fig. A
⑩Into Act Slide Ass'y Hole
⑦Axle
⑥Axle
④Rotary Switch (Mode Detector Switch)
⑪Pin, Slide Cam Ass'y
Main Cam
③Mode Cam
Groove 4
⑪Pin
⑧Pin
Groove 3
Fig. B

Fig. 5-4-2. Mode Cam

5-5. COMPL HEAD BRACKET (ACE HEAD) (See Fig. 5-5-1.)

1. Removal

1) Remove the COMPL HEAD BRACKET special mounting nut ②.
2) Remove the SLEEVE ③, the COMPL HEAD BRACKET ① and the ACE HEAD SPRING COIL ④, in that order.

Note : Take care not to scratch or soil the ACE head surface.

2. Remounting

1) Apply grease to the axle ⑥ as shown in Fig. A.
2) Apply grease to the spot where the COMPL HEAD BRACKET ① makes contact with the STOPPER ⑦ (See Fig. A).
3) Mount the ACE HEAD SPRING COIL ④ and the COMPL HEAD BRACKET ①, in that order, onto the axle ⑥. Hook one end of the ACE HEAD SPRING COIL ④ to the notch ⑤, and the other end to the COMPL HEAD BRACKET, so that the COMPL HEAD BRACKET is pressed against the STOPPER ⑦ (See Fig. A).
4) Mount the SPECIAL NUT ② onto the axle ⑥ through the SLEEVE ③.
5) Clean the ACE head surface with a chamois leather moistened with methyl alcohol.
6) Perform ACE head adjustment as instructed in 6-4.

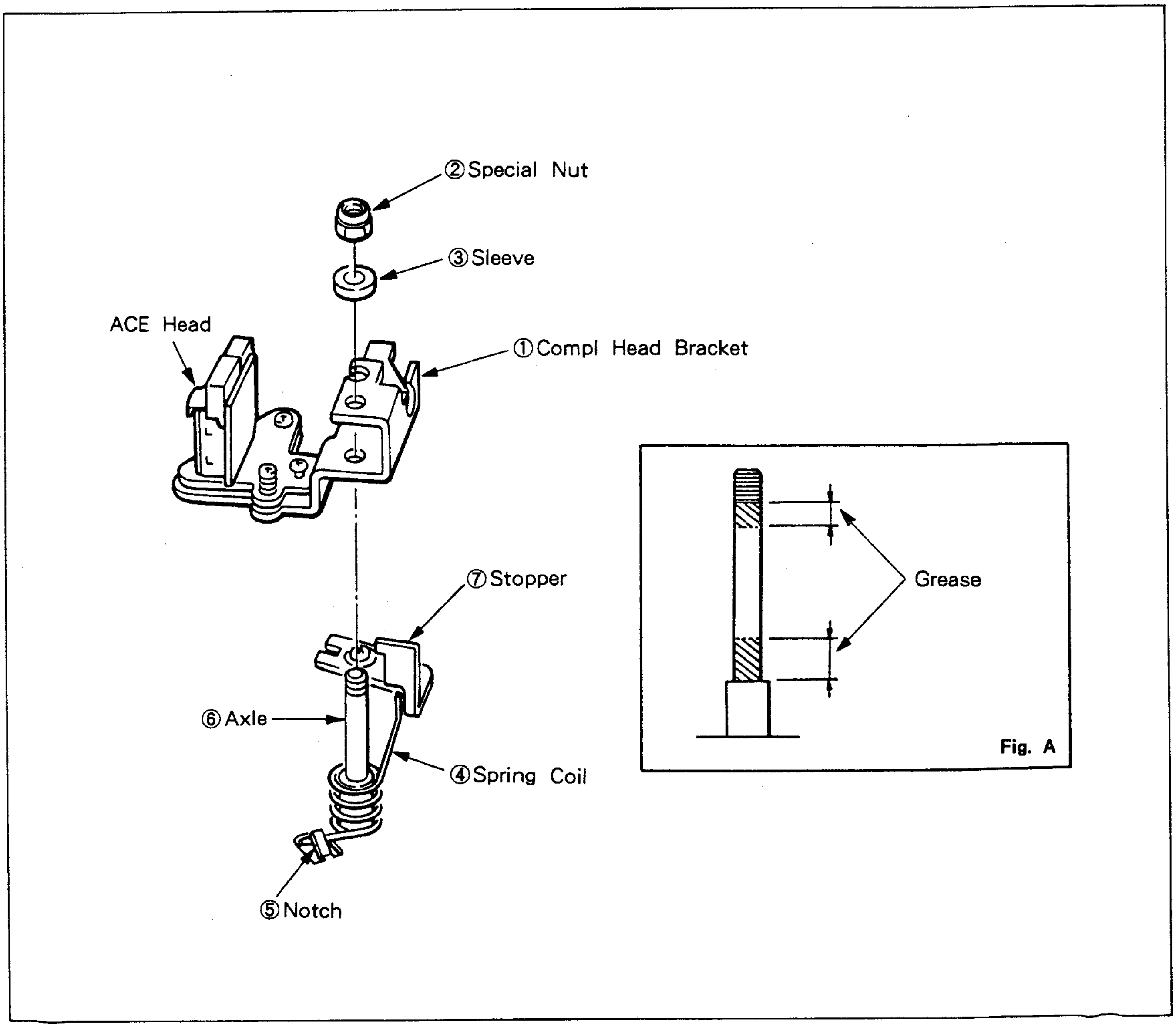

②Special Nut
③Sleeve
ACE Head
①Compl Head Bracket
⑦Stopper
⑥Axle
④Spring Coil
⑤Notch
Grease
Fig. A

Fig. 5-5-1. Compl Head Bracket (ACE Head)

5-6. PINCH ROLLER PRESSURE MECHANISM (See Fig. 5-6-1.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the COMPL HEAD BRACKET as instructed in 5-5.
3) Remove the PINCH SPRING COIL ①.
4) Remove the special washer ②, then remove the PINCH LEVER ASS'Y ③.
5) Remove the REV GUIDE LEVER SPRING COIL ④.
6) Remove the REV GUIDE LEVER ASS'Y ⑥ from the hook ⑤ of the plastic molding bearing on the bottom side. Use a jig VHJ-0073 shown in Fig. 5-6-2 to widen the hook ⑤ of the plastic molding bearing. By so doing, the above removal of the REV GUIDE LEVER ASS'Y ⑥ can be made more easily. Care should be taken to avoid pushing the jig VHJ-0073 too much. Pushing it too hard may damage the hook in an extreme case.
7) Remove the LINK LOCK SPRING COIL ⑦.
8) Remove the special washer ⑧, then remove the PINCH CAM LEVER ASS'Y ⑨.
9) Remove the ACT PINCH SLIDE ASS'Y ⑩.

Note : If damaged the claw ⑤ of the plastic bearing, reference should be made to Section 3. "Method of Repairing the Bearing Section of REV GUIDE LEVER ASSEMBLY".

2. Remounting

1) Apply grease to pins ⑫/⑬ and axles ⑯/⑱.
2) Apply grease to the ACT PINCH SLIDE ASS'Y pin ⑰.
3) Set the INITIAL mode with the mode selector (VHJ-0050).
4) Mount the ACT PINCH SLIDE ASS'Y ⑩ onto pins ⑫ and ⑬.
5) Insert the pin ⑭ of the PINCH CAM LEVER ASS'Y ⑨ into the MAIN CAM ⑪ GROOVE 1, and mount onto the axle ⑯ while inserting the pin ⑰ of the ACT PINCH SLIDE ASS'Y into the hole ⑮.
6) Mount the special washer ⑧ onto the axle ⑯.
7) Hook the LINK LOCK SPRING COIL ⑦ to the PINCH CAM LEVER ASS'Y ⑨.
8) Mount the REV GUIDE LEVER ASS'Y ⑥ to the plastic molding bearing, then fix it with the hook ⑤ at the bottom.
9) Hook the REV GUIDE LEVER SPRING COIL ④.
10) Mount the PINCH LEVER ASS'Y ③ to the axle ⑱.
11) Mount the special washer ② to the axle ⑱.
12) Hook the PINCH SPRING COIL ① between the ACT PINCH SLIDE ASS'Y ⑩ and the PINCH LEVER ASS'Y ③.
13) Mount the COMPL HEAD BRACKET as instructed in 5-5.
14) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
15) Perform ACE head adjustment as instructed in 6-4.

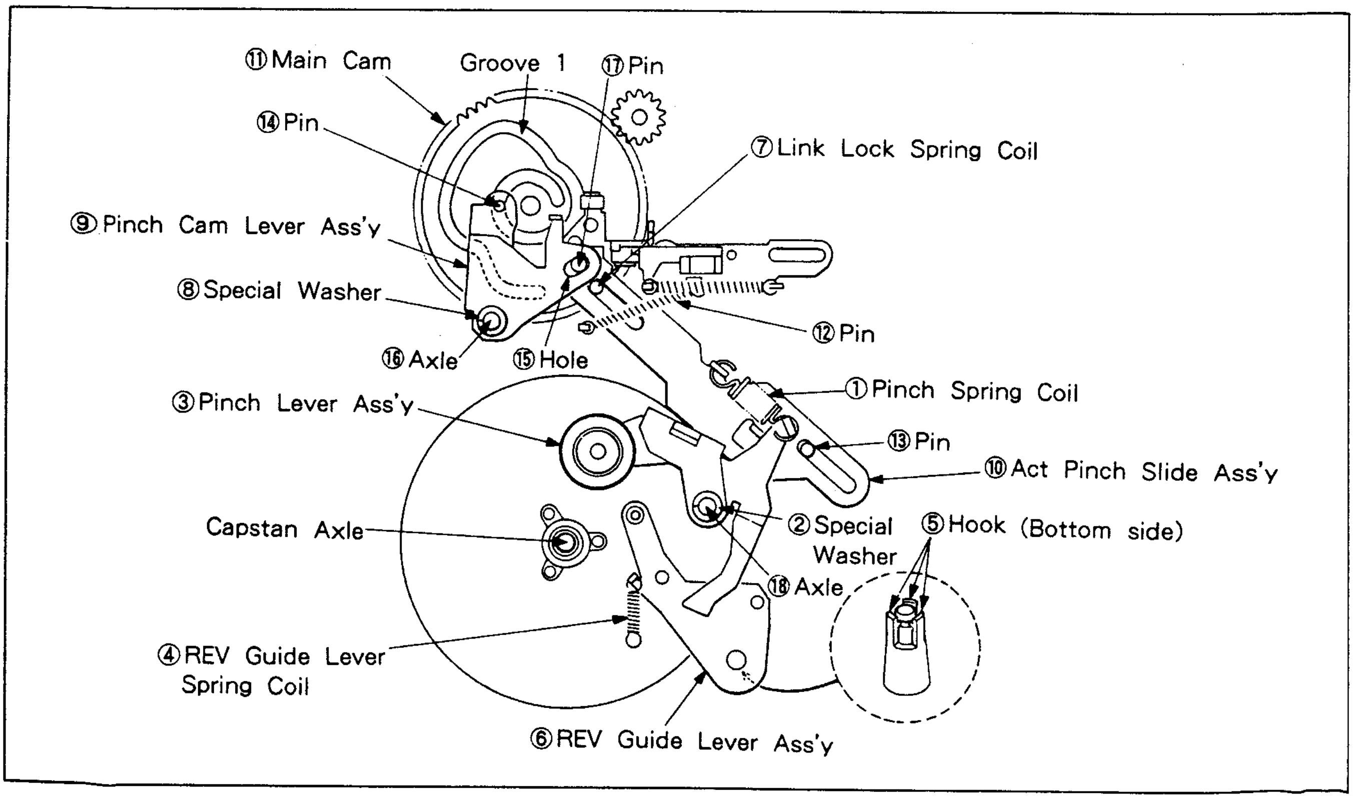
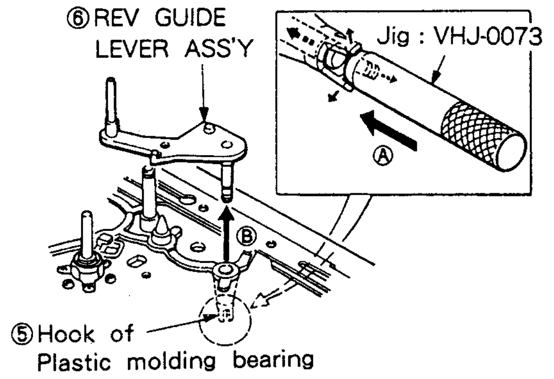

⑪Main Cam
Groove 1
⑰Pin
⑭Pin
⑦Link Lock Spring Coil
⑨Pinch Cam Lever Ass'y
⑧Special Washer
⑫Pin
⑯Axle
⑮Hole
①Pinch Spring Coil
③Pinch Lever Ass'y
⑬Pin
⑩Act Pinch Slide Ass'y
Capstan Axle
②Special Washer
⑤Hook (Bottom side)
⑱Axle
④REV Guide Lever Spring Coil
⑥REV Guide Lever Ass'y

Fig. 5-6-1. Pinch Roller Pressing Mechanism


⑥REV GUIDE LEVER ASS'Y
Jig : VHJ-0073
Ⓐ
Ⓑ
⑤Hook of Plastic molding bearing

Remove REV GUIDE LEVER ASS'Y in the direction of arrow Ⓑ, pushing VHJ-0073 slightly in the direction of arrow Ⓐ.
Be careful not to damage the hook by pushing too much.

Fig. 5-6-2 Method of Using the Jig VHJ-0073

3. Method of Repairing the Bearing Section of REV GUIDE LEVER ASSEMBLY

If the hook of the plastic molding bearing is damaged in the process of removing the REV GUIDE LEVER ASS'Y, proceed with the repair as follows :

1) Scrape the broken hook of the bearing section with a cutter knife and flatten it.
2) Insert the REV GUIDE LEVER ASS'Y in the bearing and fit a stopper washer in. The special washer to be used must be Part No. 411 109 1605. This stop washer (Part No. 411 109 1605) is the same as that used on SUPPLY REEL ASS'Y or TAKE-UP REEL ASS'Y.
   Remove the REV GUIDE LEVER ASSEMBLY toward an arrow B while pushing the jig VHJ-0073 lightly in the direction of an arrow.

Pushing the jig VHJ-0073 too much may cause hook breakage. Therefore, care should be taken.

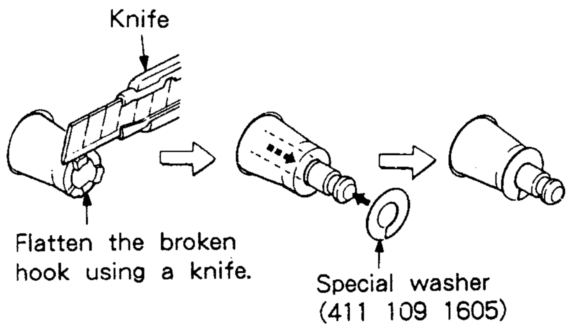

Knife
Flatten the broken hook using a knife.
Special washer (411 109 1605)

Fig. 5-6-3 Method of Repairing the Bearinig Section of the REV GUIDE LEVER ASSEMBLYE

5-7. BRAKE MECHANISM

5-7-1. Sub Take-up Brake Ass'y (See Fig. 5-7-1.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the SPRING COIL ①.
3) While pushing the hook ② in the direction of arrow, remove the SUB TAKE-UP BRAKE ASS'Y ③.

2. Remounting

1) Mount the SUB TAKE-UP BRAKE ASS'Y ③ onto the pin ④. Confirm that the hook ② is firmly hooked to the chassis.
2) Fit the SPRING COIL between hooks ⑤ and ⑥.
3) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.

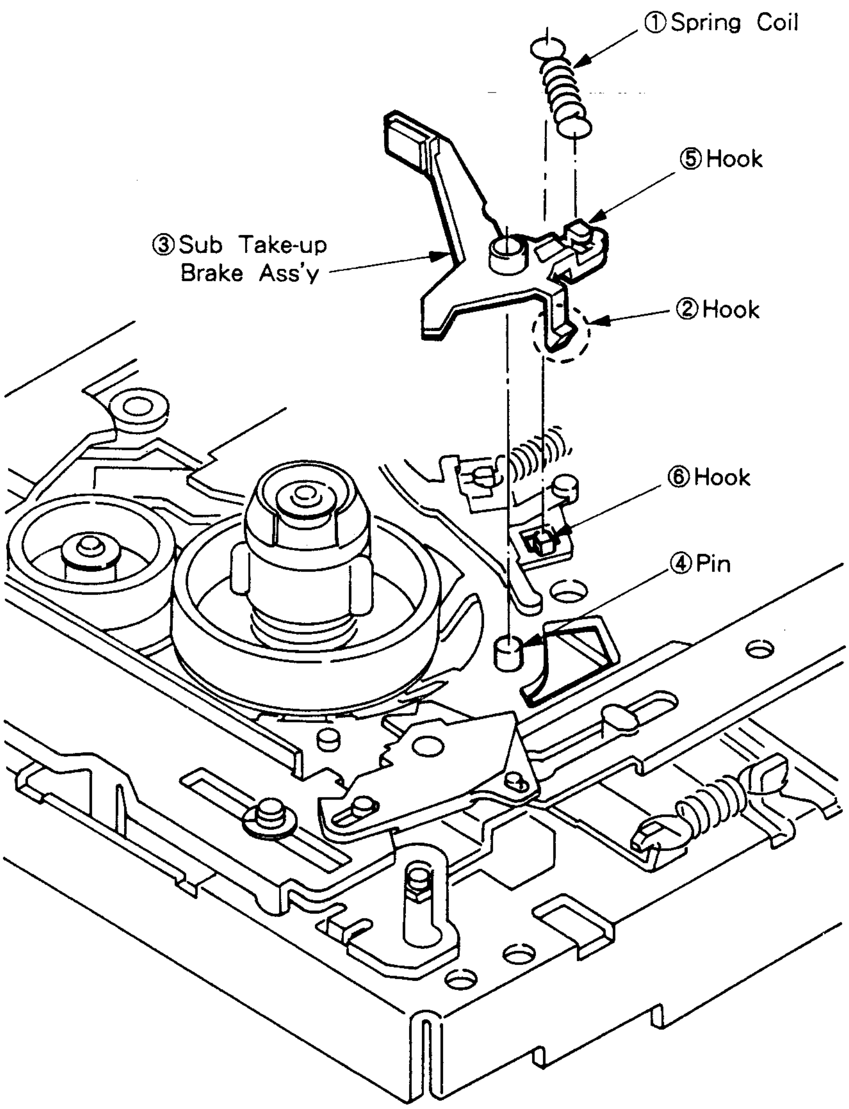

①Spring Coil
⑤Hook
③Sub Take-up Brake Ass'y
②Hook
⑥Hook
④Pin

Fig. 5-7-1. Sub Take-up Brake Ass'y

5-7-2. Supply Brake Ass'y and Take-up Brake Ass'y (See Fig. 5-7-2.)

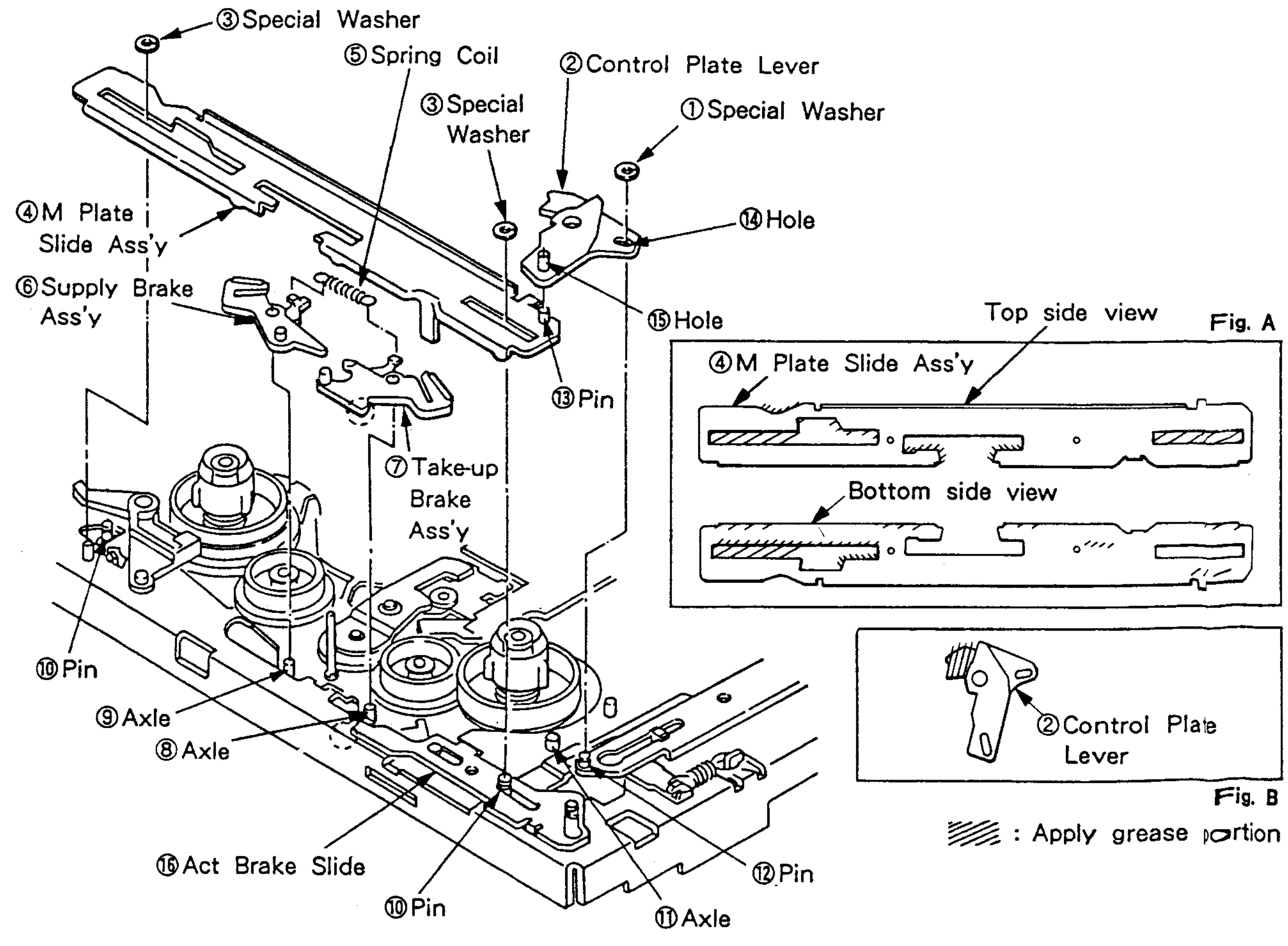
1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the SUB TAKE-UP BRAKE as instructed in 5-7-1.
3) Remove the special washer ①, then remove the CONTROL PLATE LEVER ②.
4) Remove the two special washers ③, then remove the M PLATE SLIDE ASS'Y ④.
5) Remove the SPRING COIL ⑤.
6) Remove the SUPPLY BRAKE ASS'Y ⑥ and the TAKE-UP BRAKE ASS'Y ⑦.

Note : Take care not to soil the brake shoes.

2. Remounting

1) Apply a thin layer of grease to axles ⑧ and ⑨.
2) Mount the TAKE-UP BRAKE ASS'Y ⑦ onto the axle ⑧.
3) Mount the SUPPLY BRAKE ASS'Y ⑥ onto the axle ⑨.
4) After applying a thin layer of grease to the M PLATE SLIDE ASS'Y ④ as shown in Fig. A, mount it onto the two pins ⑩.
5) Mount the two special washers ③ onto the two pins ⑩.
6) After applying grease to the CONTROL PLATE LEVER ② as shown in Fig. B, mount it onto the axle ⑪. Insert the ACT PLATE SLIDE ASS'Y pin ⑫ into the hole ⑭, and the M PLATE SLIDE ASS'Y pin ⑬ into the hole ⑮.
7) Mount the special washer ① onto the pin ⑫.
8) Mount the SUB TAKE-UP BRAKE as instructed in 5-7-1.
9) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.


③Special Washer
⑤Spring Coil
②Control Plate Lever
③Special Washer
①Special Washer
⑭Hole
④M Plate Slide Ass'y
⑥Supply Brake Ass'y
⑮Hole
⑬Pin
⑦Take-up Brake Ass'y
Top side view
Fig. A
④M Plate Slide Ass'y
Bottom side view
⑩Pin
⑨Axle
⑧Axle
②Control Plate Lever
Fig. B
⑯Act Brake Slide
⑩Pin
⑫Pin
⑪Axle

▨ : Apply grease portion

When assembling, the contact surfaces of Take-up Brake ⑦ and the Brake Slide ⑯ marked with ◌ should contact but not overlap each other.

Fig. 5-7-2. Supply Brake Ass'y & Take-up Brake Ass'y

5-7-3. Tension Lever Ass'y and Band Holder Ass'y (See Fig. 5-7-3.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the SPRING COIL ①.
3) Remove the screw ③ fixing the BAND HOLDER ASS'Y ②.
4) Push the SUB SUPPLY BRAKE ④ in the direction of the arrow A, setting the BAND HOLDER ASS'Y ② free.
5) Open the hook ⑤ a little and remove the TENSION LEVER ASS'Y ⑥. Take care not to open the hook ⑤ too much, otherwise it may be deformed or broken.
6) Remove the hook ⑦ of the BAND HOLDER ASS'Y.

2. Remounting

1) Mount the BAND HOLDER ASS'Y hook ⑦ into the TENSION LEVER ASS'Y hole ⑧.
2) Insert the TENSION LEVER ASS'Y axle ⑨ into the hole ⑩ and confirm that the hook ⑤ is hooked.
3) While pushing the SUB SUPPLY BRAKE ④ in the direction of arrow A, mount the BAND HOLDER ASS'Y ② with the screw ③.
4) Hook the SPRING COIL ① between the hooks ⑪ and ⑫.
5) Perform TENSION POLE position adjustment as instructed in 6-3.
6) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.

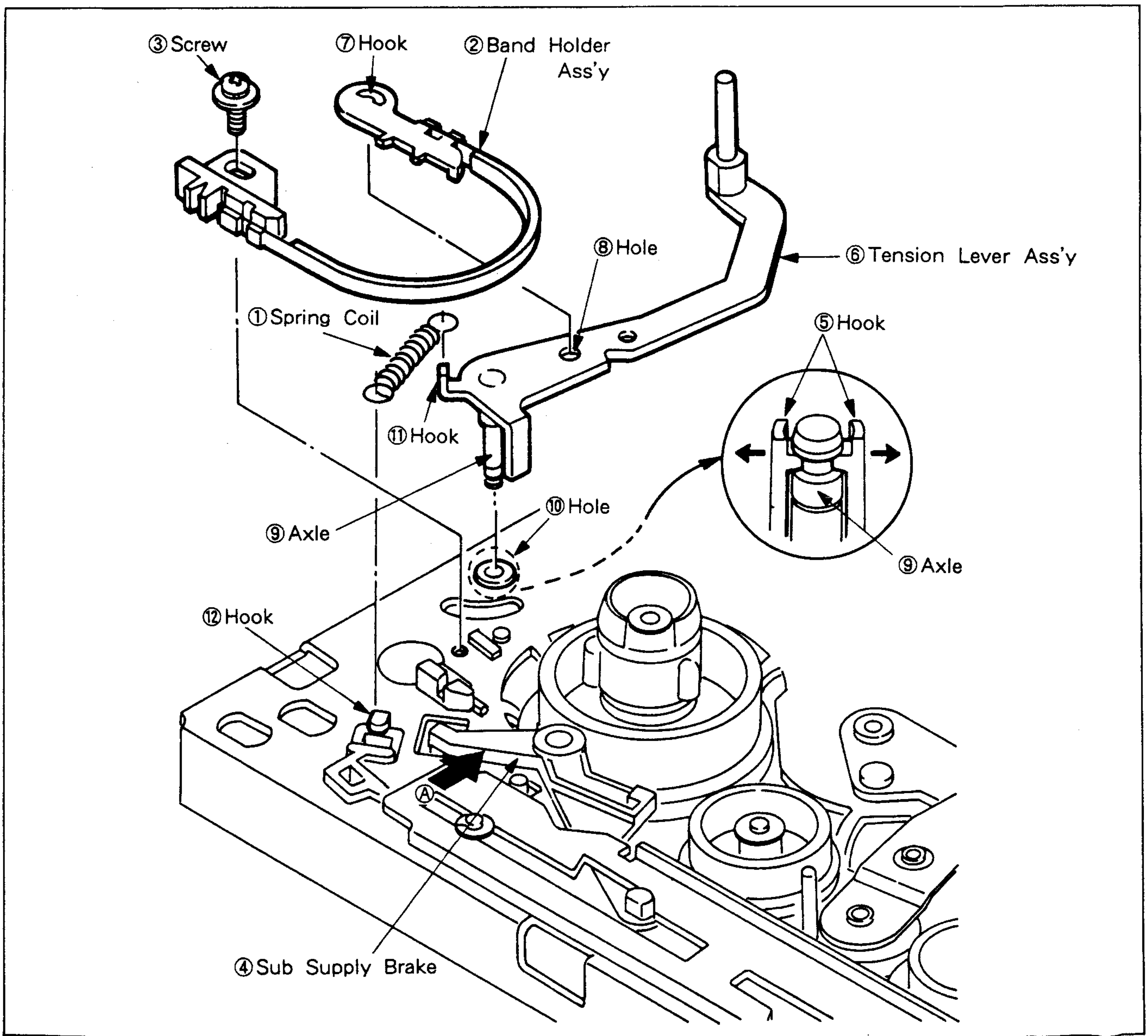

③Screw
⑦Hook
②Band Holder Ass'y
⑧Hole
⑥Tension Lever Ass'y
⑤Hook
①Spring Coil
⑪Hook
⑩Hole
⑨Axle
⑨Axle
⑫Hook
Ⓐ
④Sub Supply Brake

Fig. 5-7-3. Tension Lever Ass'y & Band Holder Ass'y

5-7-4. Capstan Brake Ass'y (See Fig. 5-7-4.)

1. Removal

1) Remove the SPRING COIL ①.
2) Unhook the hook ②, then remove the CAPSTAN BRAKE ASS'Y ③.

2. Remounting

1) Mount the CAPSTAN BRAKE ASS'Y ③ onto the axle ④. Confirm that the hook ② is hooked to the chassis.
2) Hook the SPRING COIL ① between hooks ⑤ and ⑥. Fix the hook ⑥ side with adhesive (use an adhesive that allows later detaching).

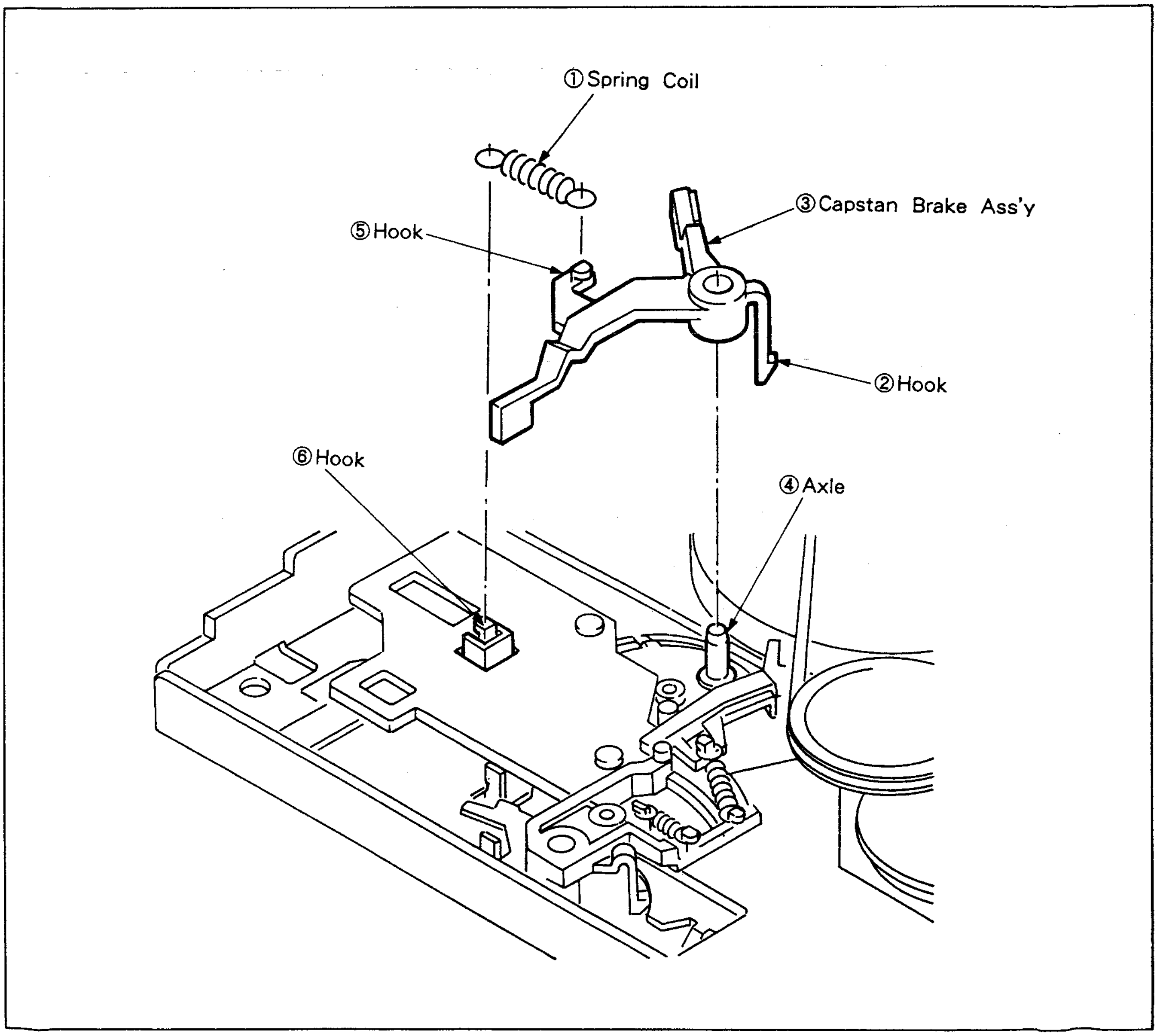

①Spring Coil
③Capstan Brake Ass'y
⑤Hook
②Hook
⑥Hook
④Axle

Fig. 5-7-4. Capstan Brake Ass'y

5-8. REEL TABLE DRIVE MECHANISM

5-8-1. Supply Reel Ass'y and Supply Reel Gear (See Fig. 5-8-1.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the BAND HOLDER ASS'Y as instructed in 5-7-3.
3) Set the PLAY mode with the mode selector (VHJ-0050).
4) Remove the special washer ①, then remove the SUPPLY REEL ASS'Y ② and the washer ③.
5) Remove the special washer ④.
6) While pushing the SUPPLY BRAKE ASS'Y ⑤ in the direction of arrow A, remove the SUPPLY REEL GEAR ⑥ and the washer ⑦.

Note : Be sure that no dirt gets on the section where both brake shoes make contact.

2. Remounting

1) Apply a little oil (less than one drop) to the part of the axle ⑧ indicated by the arrow B, then mount the washer ⑦.
2) While pushing the SUPPLY BRAKE ASS'Y ⑤ in the direction of arrow A, mount the SUPPLY REEL GEAR ⑥ onto the axle ⑧.
3) Mount the special washer ④ to the axle ⑧.
4) Apply 1 drop of oil to the part of the axle ⑨ indicated by the arrow C, then mount the washer ③.
5) Mount the SUPPLY REEL ASS'Y ② onto the axle ⑨.
6) Perform reel table height adjustment as instructed in 6-2-1.
7) Mount the special washer ① onto the axle ⑨.
8) Mount the BAND HOLDER ASS'Y as instructed in 5-7-3.
9) Perform tension pole position adjustment as instructed in 6-3.
10) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.

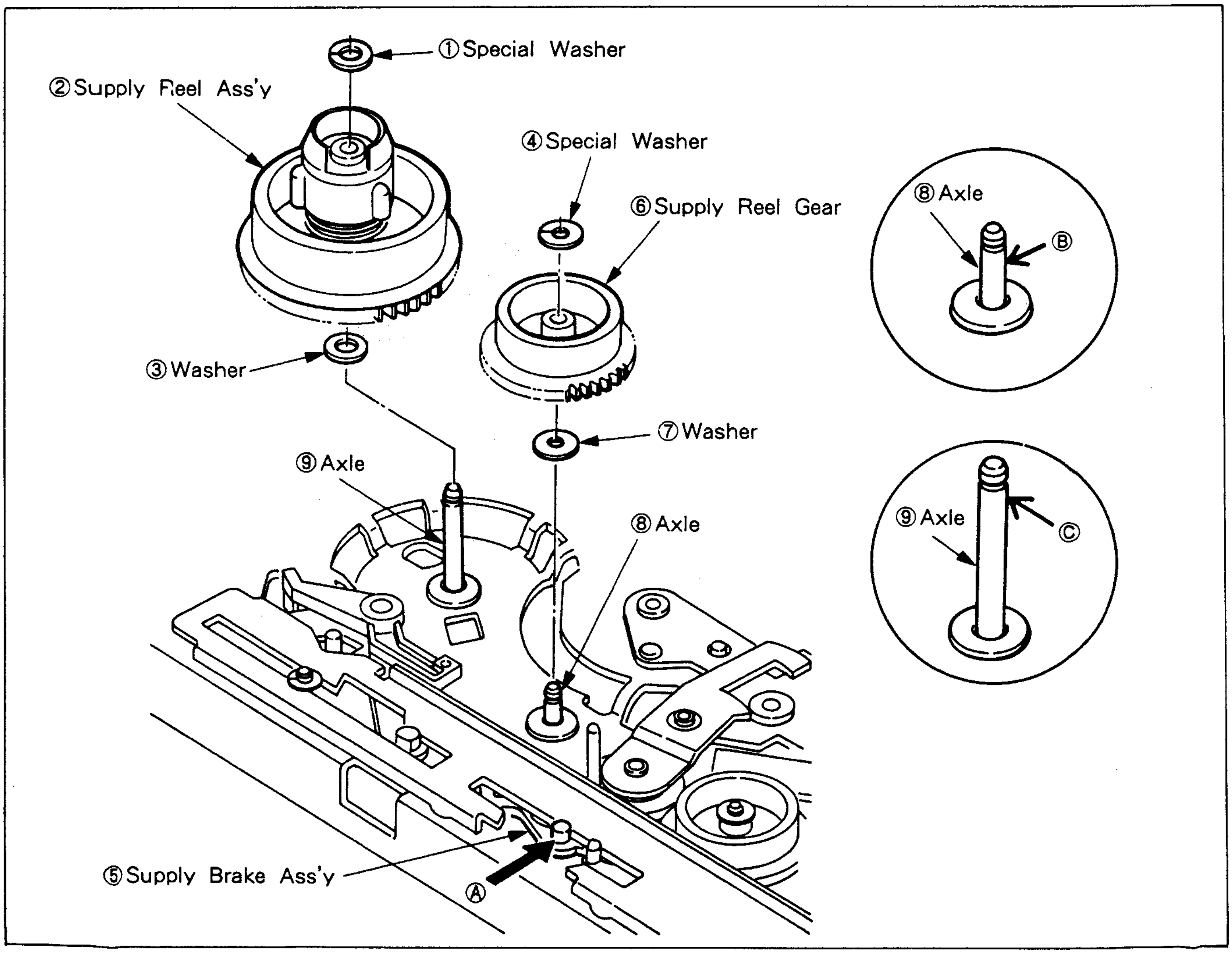


Fig. 5-8-1. Supply Reel Ass'y & Supply Reel Gear

5-8-2. Take-up Reel Ass'y (See Fig. 5-8-2.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the special washer ①.
3) Push the SUB TAKE-UP BRAKE ASS'Y ② in the direction of arrow A to release the brake, then remove the TAKE-UP REEL ASS'Y ③ and the washer ④.

Note : Be sure that no dirt gets on the section where both brake shoes make contact.

2. Remounting

1) Apply 1 drop of oil to the part of the axle ⑤ indicated by the arrow B, then mount the washer ④.
2) While pushing the SUB TAKE-UP BRAKE ASS'Y ② in the direction of arrow A, mount the TAKE-UP REEL ASS'Y ③ onto the axle ⑤.
3) Perform reel table height adjustment as instructed in 6-2.
4) Mount the special washer ① onto the axle ⑤.
5) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.

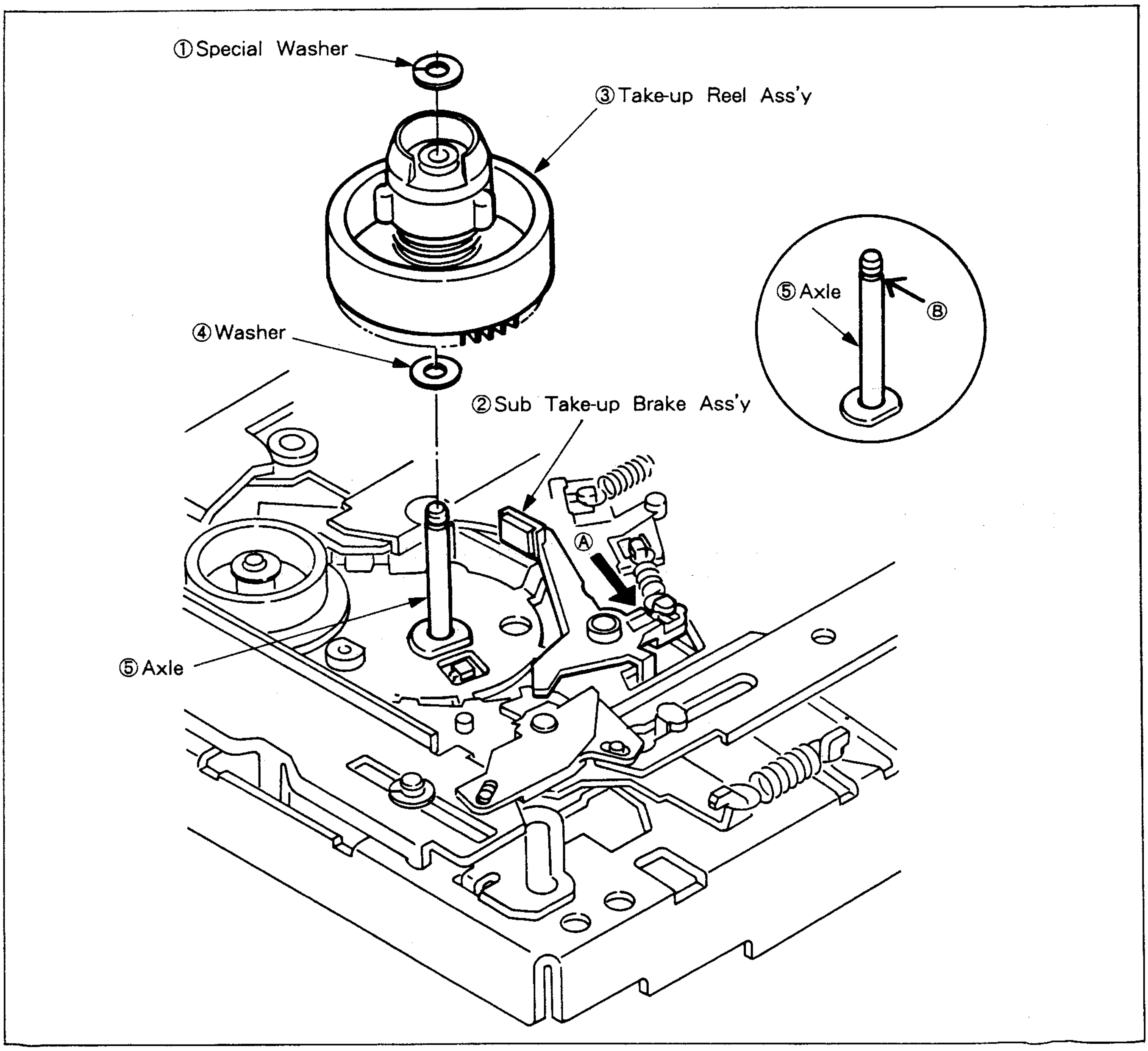


Fig. 5-8-2. Take-up Reel Ass'y

5-8-3. Take-up Reel Gear (See Fig. 5-8-3.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the TAKE-UP REEL ASS'Y as instructed in 5-8-2.
3) Remove the SUB TAKE-UP BRAKE ASS'Y as instructed in 5-7-1.
4) Remove the TAKE-UP BRAKE ASS'Y as instructed in 5-7-2.
5) Remove the special washer ①, then remove the TAKE-UP REEL GEAR ③ and the washer ④.

2. Remounting

1) Apply a little oil (less than one drop) to the part of the axle ⑤ indicated with an arrow.
2) Mount the washer ④ and the TAKE-UP REEL GEAR ③ onto the axle ⑤.
3) Mount the special washer ① onto the axle ⑤.
4) Mount the TAKE-UP BRAKE ASS'Y as instructed in 5-7-2.
5) Mount the SUB TAKE-UP BRAKE ASS'Y as instructed in 5-7-1.
6) Mount the TAKE-UP REEL ASS'Y as instructed in 5-8-2.
7) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.

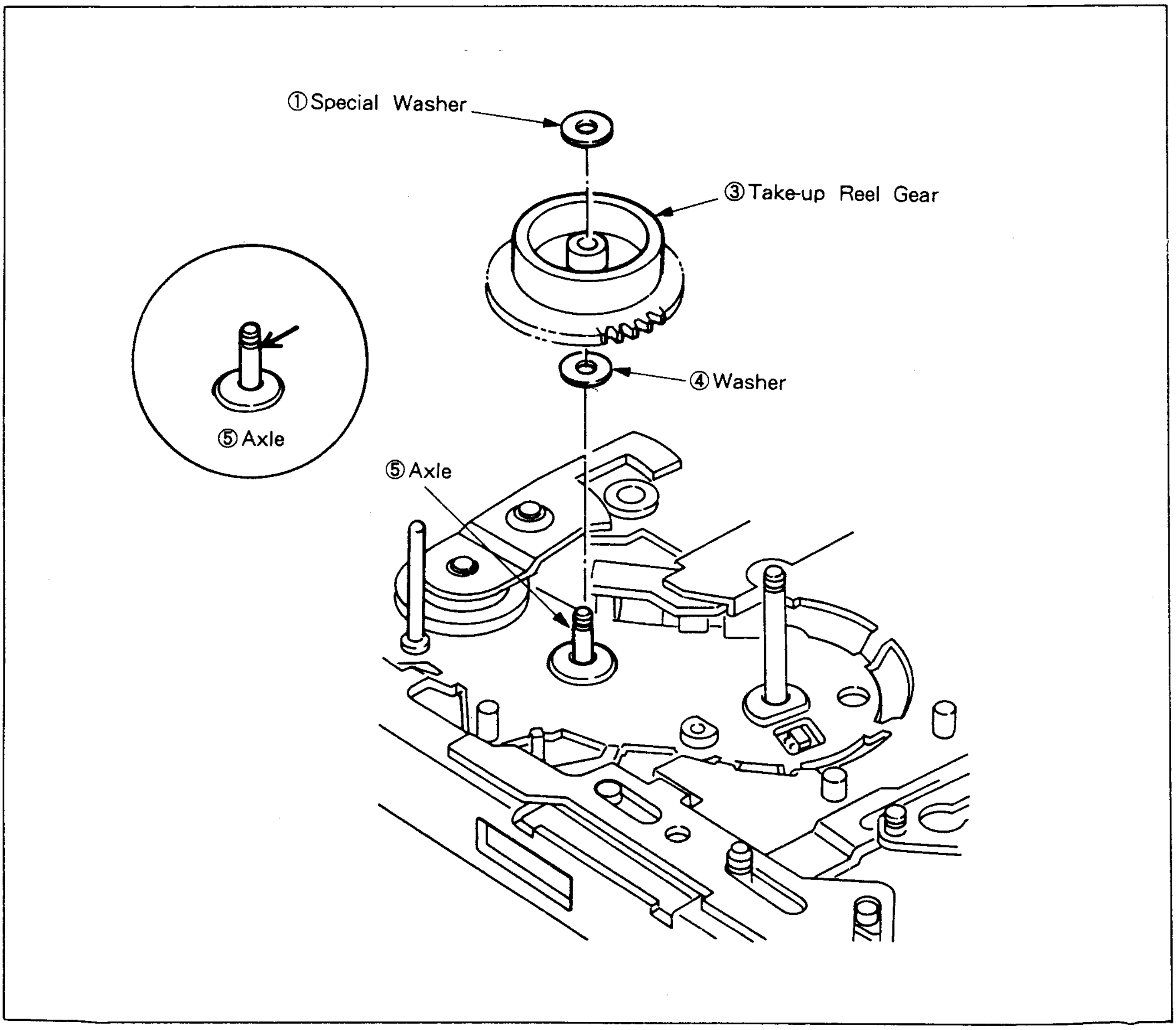


Fig. 5-8-3. TaKe-up Reel Gear

5-8-4. Reel Pulley and Friction Gear Ass'y (See Fig. 5-8-4.)

1. Removal

1) Remove the two screws ①, then remove the PULLEY BRACKET ②.
2) Remove the REEL DRIVE BELT ③.
3) Remove the special washer ④, then remove the REEL PULLEY ⑤.
4) Remove the special washer ⑥, then remove the FRICTION GEAR ASS'Y ⑦ and the washer ⑧.

2. Remounting

1) Apply one drop of oil to the parts of axles ⑨ and ⑩ indicated with an arrow.
2) Mount the washer ⑧ and the FRICTION GEAR ASS'Y ⑦ onto the axle ⑨.
3) Mount the special washer ⑥ onto the axle ⑨.
4) Mount the REEL PULLEY ⑤ onto the axle ⑩.
5) Mount the special washer ④ onto the axle ⑩.
6) Set the REEL DRIVE BELT ③.
7) Mount the PULLEY BRACKET ② with the two screws ①.

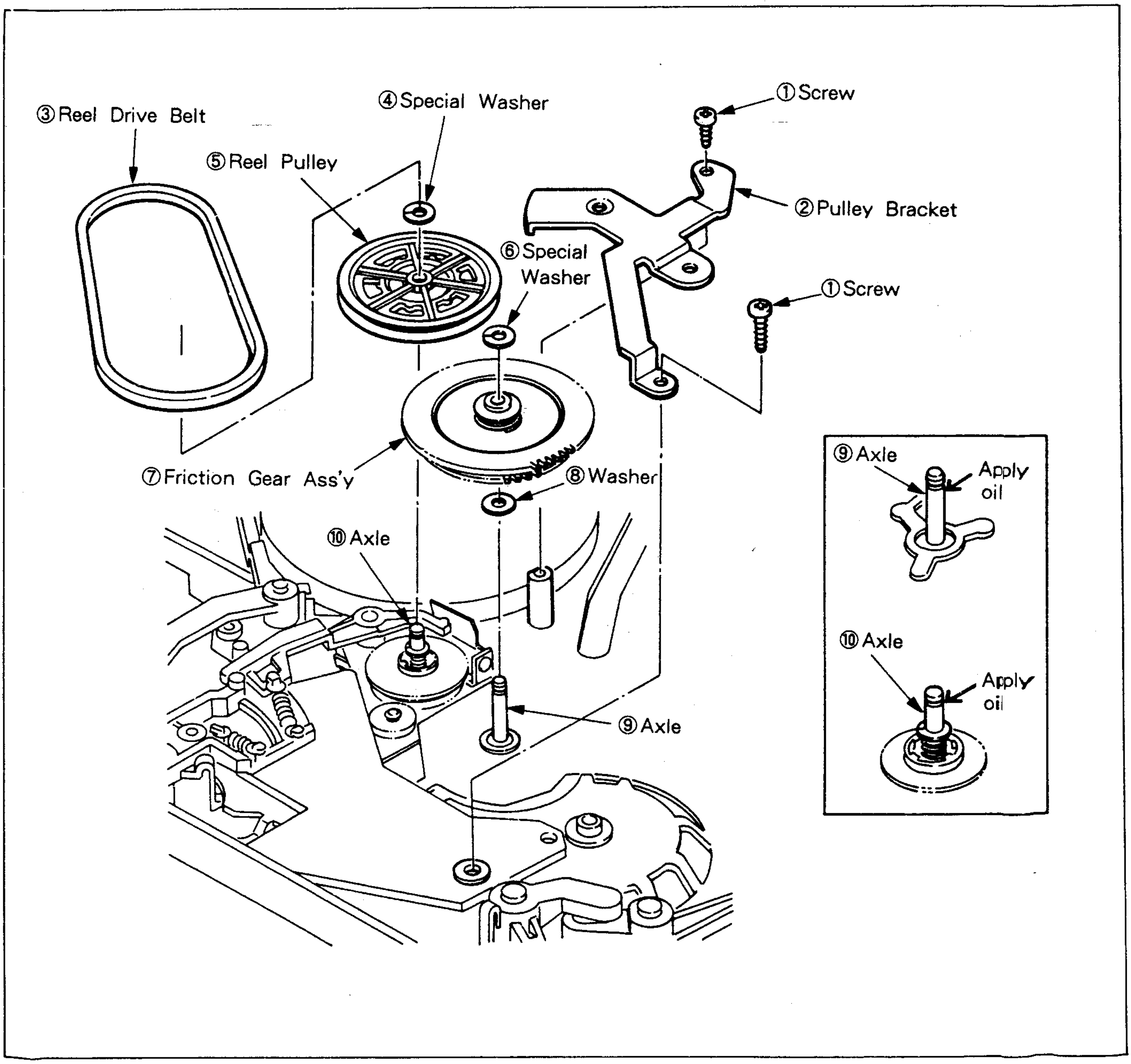

③Reel Drive Belt
④Special Washer
①Screw
⑤Reel Pulley
②Pulley Bracket
⑥Special Washer
①Screw
⑦Friction Gear Ass'y
⑧Washer
⑩Axle
⑨Axle
⑨Axle
Apply oil
⑩Axle
Apply oil

Fig. 5-8-4. Reel Pulley & Friction Gear

5-8-5. COMPL Clutch (See Fig. 5-8-5.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the PULLEY BRACKET, the REEL DRIVE BELT and the REEL PULLEY as instructed in 5-8-4.
3) Remove the screw ①, then remove the COMPL MC-4 ②.
4) Remove the two screws ③, then remove the COMPL CLUTCH ④.

2. Remounting

1) Mount the COMPL CLUTCH ④ with the two screws ③, aligning it with the protuberance ⑤.
2) After inserting the CN831 (COMPL MC-4) into the CN801 (COMPL MC-1), mount the COMPL MC-4 with the screw ①.
3) Mount the REEL PULLEY, the REEL DRIVE BELT and the PULLEY BRACKET as instructed in 5-8-4.
4) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.

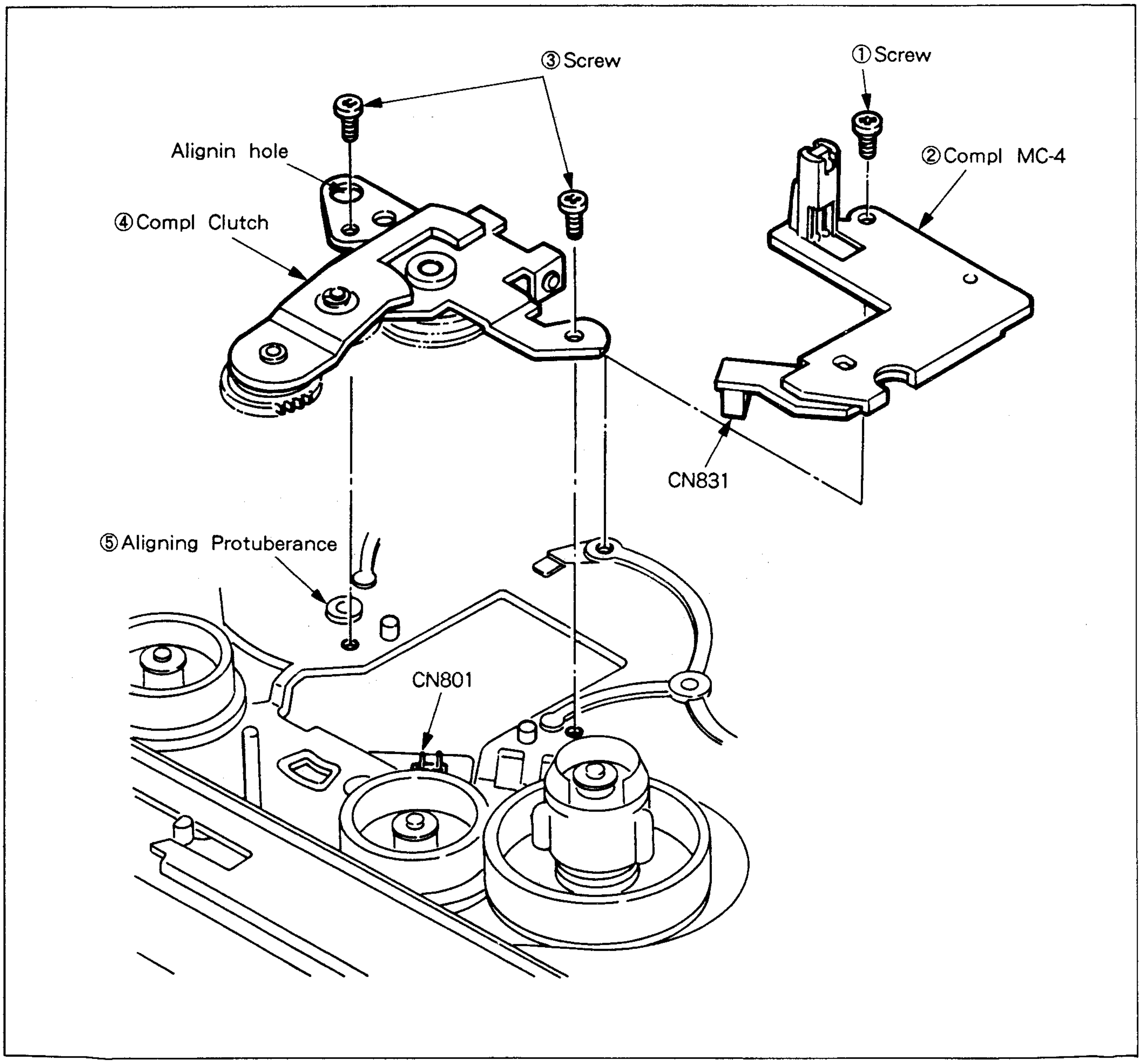

③Screw
①Screw
Alignin hole
②Compl MC-4
④Compl Clutch
CN831
⑤Aligning Protuberance
CN801

Fig. 5-8-5. Compl Clutch

5-8-6. Clutch Change Lever and Clutch Lever Ass'y (See Fig. 5-8-6.)

1. Removal

1) Remove the CAPSTAN BRAKE ASS'Y as instructed in 5-7-4.
2) Remove the PULLEY BRACKET, the REEL DRIVE BELT and the REEL PULLEY as instructed in 5-8-4.
3) Remove the SPRING COIL ①.
4) Unhook the hook ②, then remove the CLUTCH CHANGE LEVER ③.
5) Unhook the hook ⑤, then remove the CLUTCH LEVER ASS'Y ⑥.

2. Remounting

1) Mount the CLUTCH LEVER ASS'Y ⑥ onto the axle ⑦. Confirm that the hook ⑤ is hooked to the chassis.
2) Mount the CLUTCH CHANGE LEVER ③ onto the axle ⑧. Confirm that the hook ② is hooked to the chassis.
3) Hook the SPRING COIL ① between the hooks ⑨ and ⑩.
4) Mount the PULLEY BRACKET, the REEL DRIVE BELT and the REEL PULLEY as instructed in 5-8-4.
5) Mount the CAPSTAN BRAKE ASS'Y as instructed in 5-7-4.

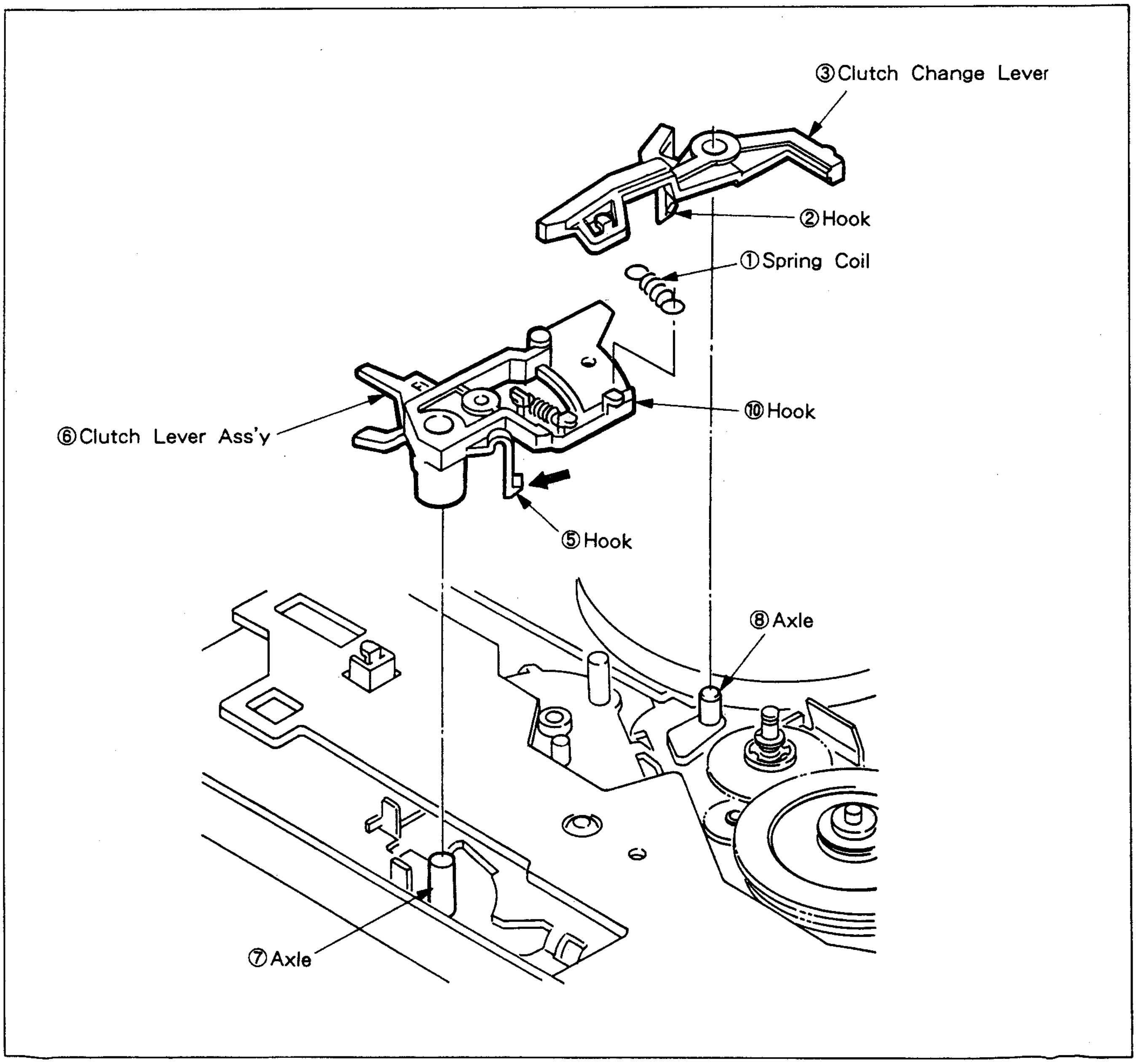


Fig. 5-8-6. Clutch Change Lever & Clutch Lever Ass'y

5-9. CAPSTAN MOTOR (See Fig. 5-9-1.)

1. Removal

1) Remove the CAPSTAN BRAKE ASS'Y as instructed in 5-7-4.
2) Remove the CAPSTAN MOTOR ⑥ connector.
3) Remove the REEL DRIVE BELT ② from the CAPSTAN MOTOR PULLEY ①.
4) Remove the two screws ④ fixing the COMPL CASSETTE MECHANISM TOP BOARD ③, then slide the TOP BOARD ③ backward.
5) Remove the three screws ⑤, then remove the CAPSTAN MOTOR ⑥.

Note : Take care not to scratch or soil the capstan axle.

2. Remounting

1) Mount the CAPSTAN MOTOR ⑥ with the three screws ⑤.
2) Connect the CAPSTAN MOTOR ⑥ connector.
3) Mount the TOP BOARD ③ with the two screws ④.
4) Fit the REEL DRIVE BELT ② around the CAPSTAN MOTOR PULLEY ① and the REEL PULLEY ⑦.
5) Mount the CAPSTAN BRAKE ASS'Y as instructed in 5-7-4.

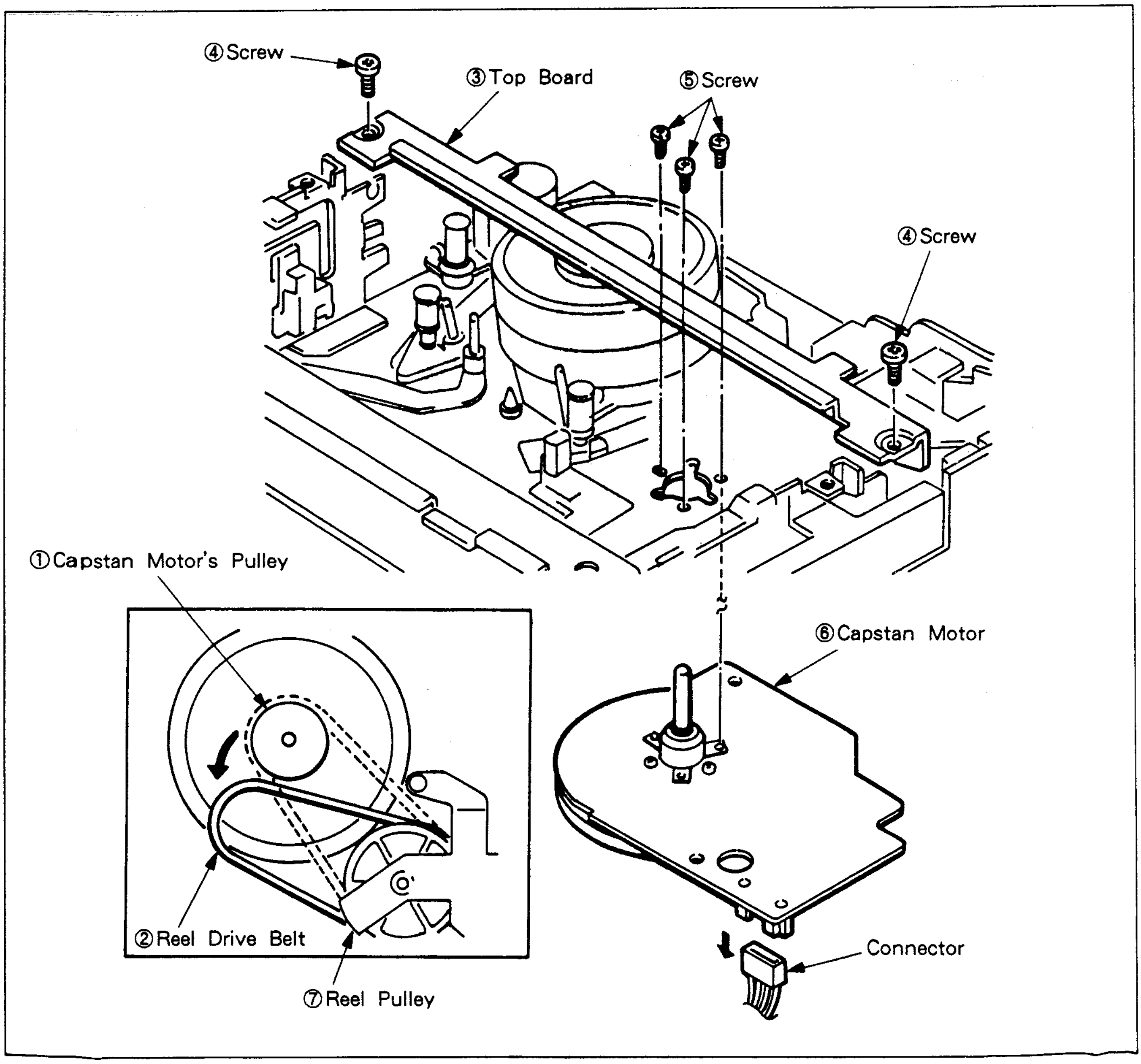

④Screw
③Top Board
⑤Screw
④Screw
①Capstan Motor's Pulley
⑥Capstan Motor
②Reel Drive Belt
Connector
⑦Reel Pulley

Fig. 5-9-1. Capstan Motor

5-10. FIXED GUIDE, FE HEAD LEVER ASS'Y

5-10-1. Entrance side Fixed Guide and FE Lever Ass'y (See Fig. 5-10-1.)

1. Removal

1) Remove the SP NUT ①, then remove the GUIDE PIPE ③ and the SP washer ② (lower), in that order.
2) Remove the SPRING COIL ⑤.
3) Remove the FTE HEAD connector.
4) Remove the special washer ⑥, then remove the FE HEAD LEVER ASS'Y ⑦.

Note : A SP washer ⑪ (upper) and a SPRING COIL ④ are sometimes inserted between the SP NUT ① and the special washer ⑥. In this case, put it back in its original position when remouting the entrance side fixed guide.

2. Remounting

1) After mounting the FE LEVER ASS'Y ⑦ onto the axle ⑧, mount the special washer ⑥.
2) Hook the SPRING COIL ⑤ between the chassis notch ⑨ and the FE LEVER ASS'Y hook ⑩.
3) Mount the SP washer ② (lower), the GUIDE pipe ③ and the SP NUT ① to the axle ⑧, in that order.
4) Connect the connector to the FTE HEAD.
5) Perform hight adjustment of the entrance side fixed guide (S) as instructed in 6-4 when remounted the SPRING COIL ④ and the SP washer ⑪ (upper).

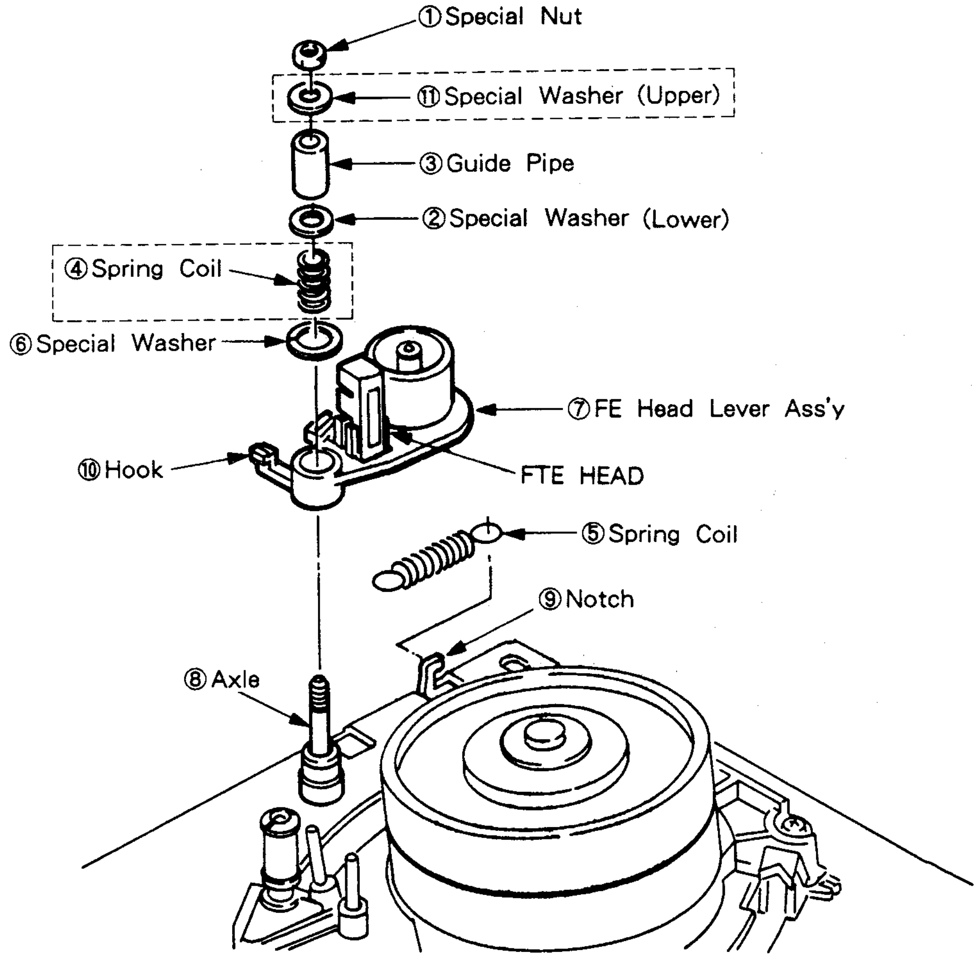

①Special Nut
⑪Special Washer (Upper)
③Guide Pipe
②Special Washer (Lower)
④Spring Coil
⑥Special Washer
⑦FE Head Lever Ass'y
⑩Hook
FTE HEAD
⑤Spring Coil
⑨Notch
⑧Axle

Fig. 5-10-1. Fixed Guide (S) & FE Lever Ass'y

5-10-2. Impedance Roller, FTE Head (See Fig. 5-10-2.)

1. Removal

1) Remove the FTE HEAD (full track erase head) ① connector.
2) Remove the special washer ②, then remove the IMPEDANCE ROLLER ③ and the washer ④.
3) Open the hook ⑤ a little and remove the FTE HEAD ①.

Note : Take care not to open the hook too much, otherwise it may be deformed or broken.

2. Remounting

1) Mount the FTE HEAD ① onto the FE HEAD LEVER ASS'Y ⑥. Confirm that the hook ⑤ is hooked to the FTE HEAD ①.
2) Mount the washer ④ and the IMPEDANCE ROLLER ③, in that order, onto the axle ⑦, then mount the special washer ②.
3) Connect the connector to the terminal of the FTE HEAD ①.

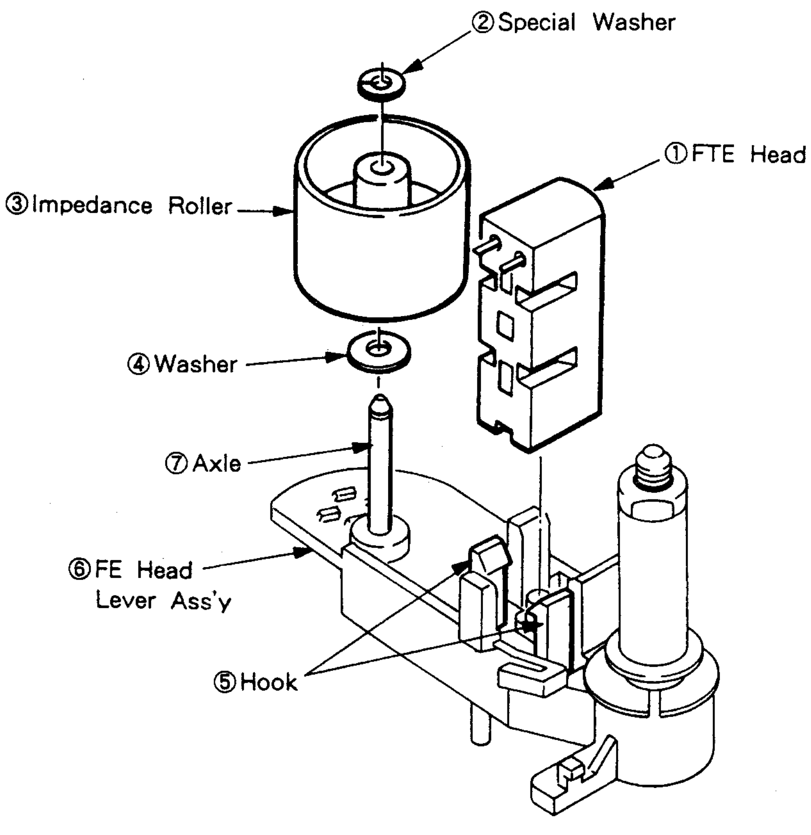

②Special Washer
①FTE Head
③Impedance Roller
④Washer
⑦Axle
⑥FE Head Lever Ass'y
⑤Hook

Fig. 5-10-2. Impedance Roller & FTE Head

5-10-3. Exit side Fixed Guide (See Fig. 5-10-3.)

1. Removal

1) Remove the CAP ①.
2) Remove the SP NUT ②, then remove the SP washer ③ (upper), the GUIDE PIPE ④, the SP washer ③ (lower) and the SPRING COIL ⑤, in that order.

2. Remounting

1) Mount the SPRING COIL ⑤, the SP washer ③ (lower), the GUIDE PIPE ④, the SP washer ③ (upper) and the SP NUT ②, in that order, to the axle ⑥.
2) Mount the CAP ① onto the axle ⑥.
3) Perform height adjustment of the fixed guide (T) as instructed in 6-4.

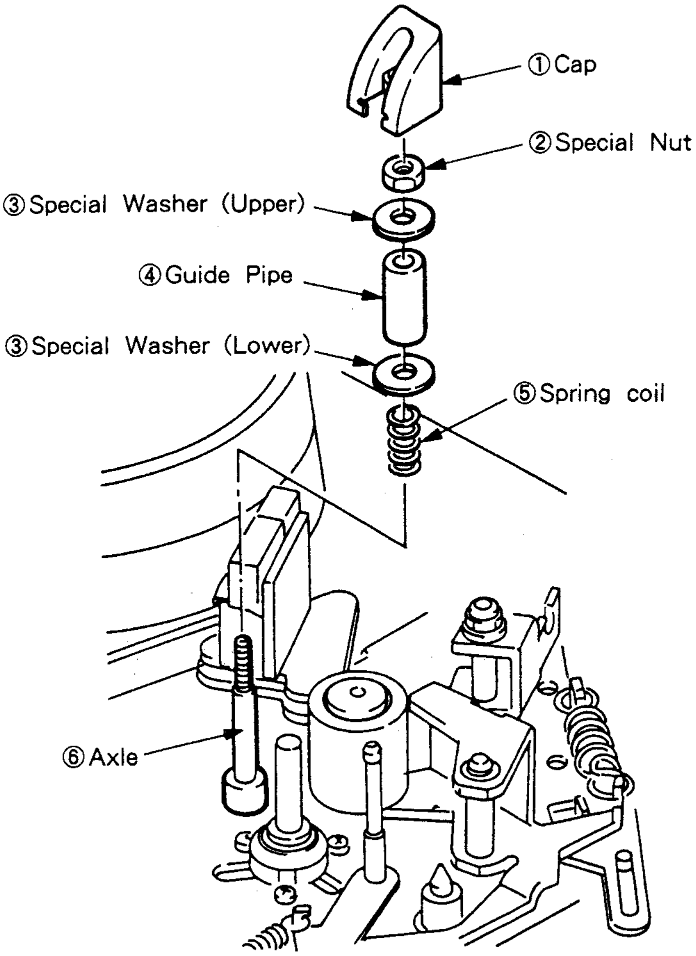

①Cap
②Special Nut
③Special Washer (Upper)
④Guide Pipe
③Special Washer (Lower)
⑤Spring coil
⑥Axle

Fig. 5-10-3. Fixed Guide (T)

5-11. DRUM SECTION

5-11-1. Drum Motor (rotor, stator) (See Fig. 5-11-1.)

1. Removal

1) Remove the screw ①, then remove the CYLINDER EARTH ASS'Y ②.
2) Remove the two screws ③, then remove the ROTOR ④ and SPACER.
3) Remove the STATOR board connector ⑩.
4) Remove the three screws ⑤, then remove the STATOR ⑥.

2. Remounting

1) Mount the STATOR ⑥ with the three screws ⑤.
2) Mount the SPACER ⑪ on to the AXLE ⑫.
3) While aligning the ROTOR oval hole ⑦ with the ROTOR DISK hole ⑧, mount the ROTOR with the two screws ③.
4) Insert the connector ⑩.
5) While aligning the CYLINDER EARTH ASS'Y ② protuberance with the chassis hole ⑨, mount it with the screw ①.

Note 1 : Use a torque driver (VHJ-0014) for mounting the STATOR ⑥ and the ROTOR ④. Set fastening torque to 3kg-cm.

Note 2 : When the drum unit has been replaced, perform a tape path adjustment as instructed in 6-4. and perform a CH-1/CH-2 switching position adjustment of the servo circuit.

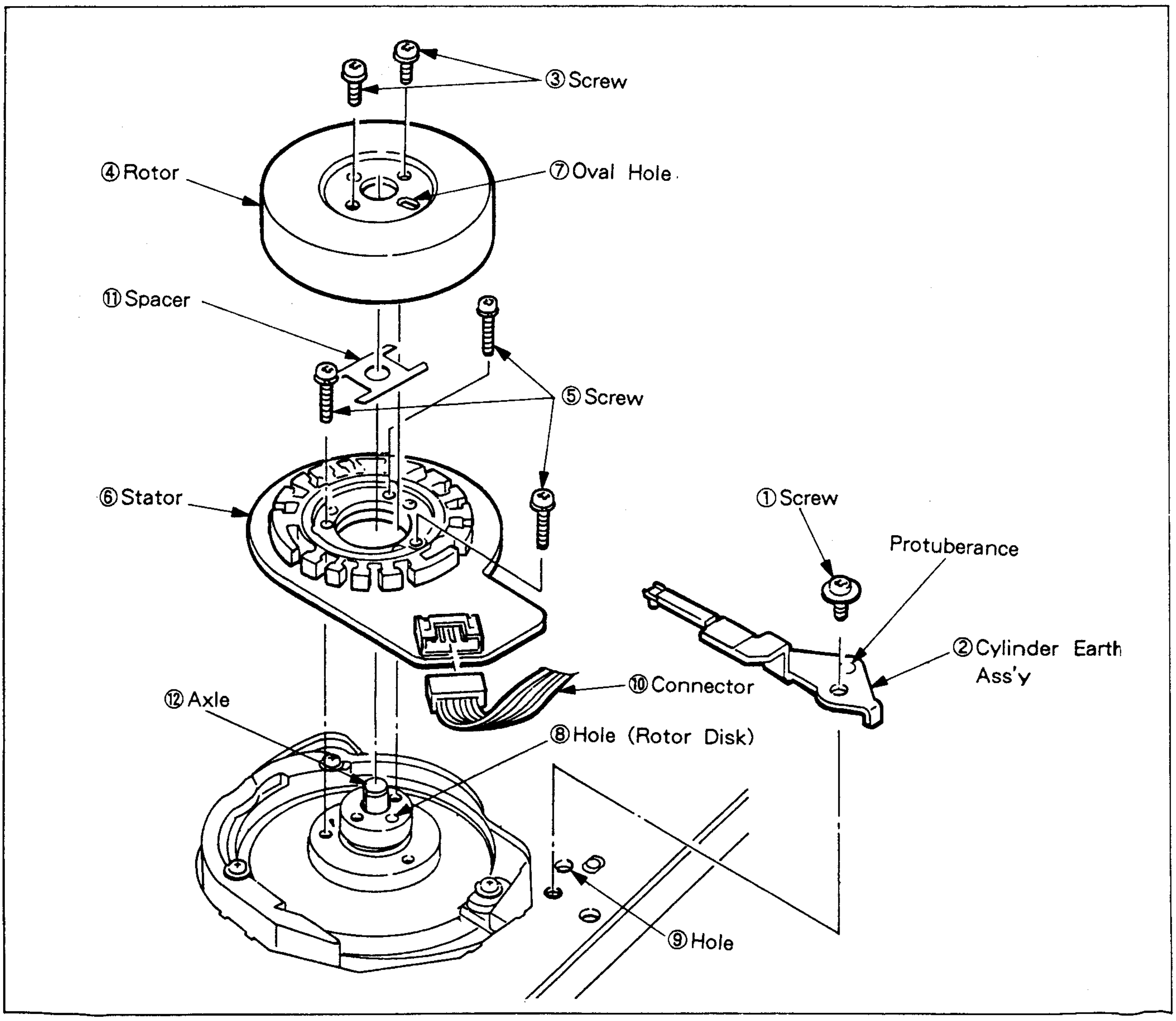

③Screw
④Rotor
⑦Oval Hole
⑪Spacer
⑤Screw
⑥Stator
①Screw
Protuberance
②Cylinder Earth Ass'y
⑩Connector
⑫Axle
⑧Hole (Rotor Disk)
⑨Hole

Fig. 5-11-1. Drum Motor

5-11-2. Drum Unit (See Fig. 5-11-2.)

1. Removal

1) For some models with the board located above the upper drum, remove the board.
2) Remove the flexible P.C.B. ① from the PRE-AMP UNIT (take care not to pull the flexible P.C.B. in the upward direction).
3) Remove the LOAD RACK only, as instructed in 5-4-1.
4) Remove the three screws ②, then remove the drum unit ③.

   NOTE : When removing and remounting the drum unit, handle it carefully to protect it from scratches and dirt.

2. Remounting

1) While aligning the drum unit ③ to the protuberance, mount it to the drum base (CYLINDER BASE) ⑤ with the three screws ②.
2) Mount the ROAD RACK as instructed in 5-4-1.
3) Insert the flexible P.C.B. into the PRE-AMP UNIT.
4) Clean the drum unit.
5) Perform the tape path adjustment as instructed in 6-4. and perform the CH-1/CH-2 switching position adjustment of the servo circuit.

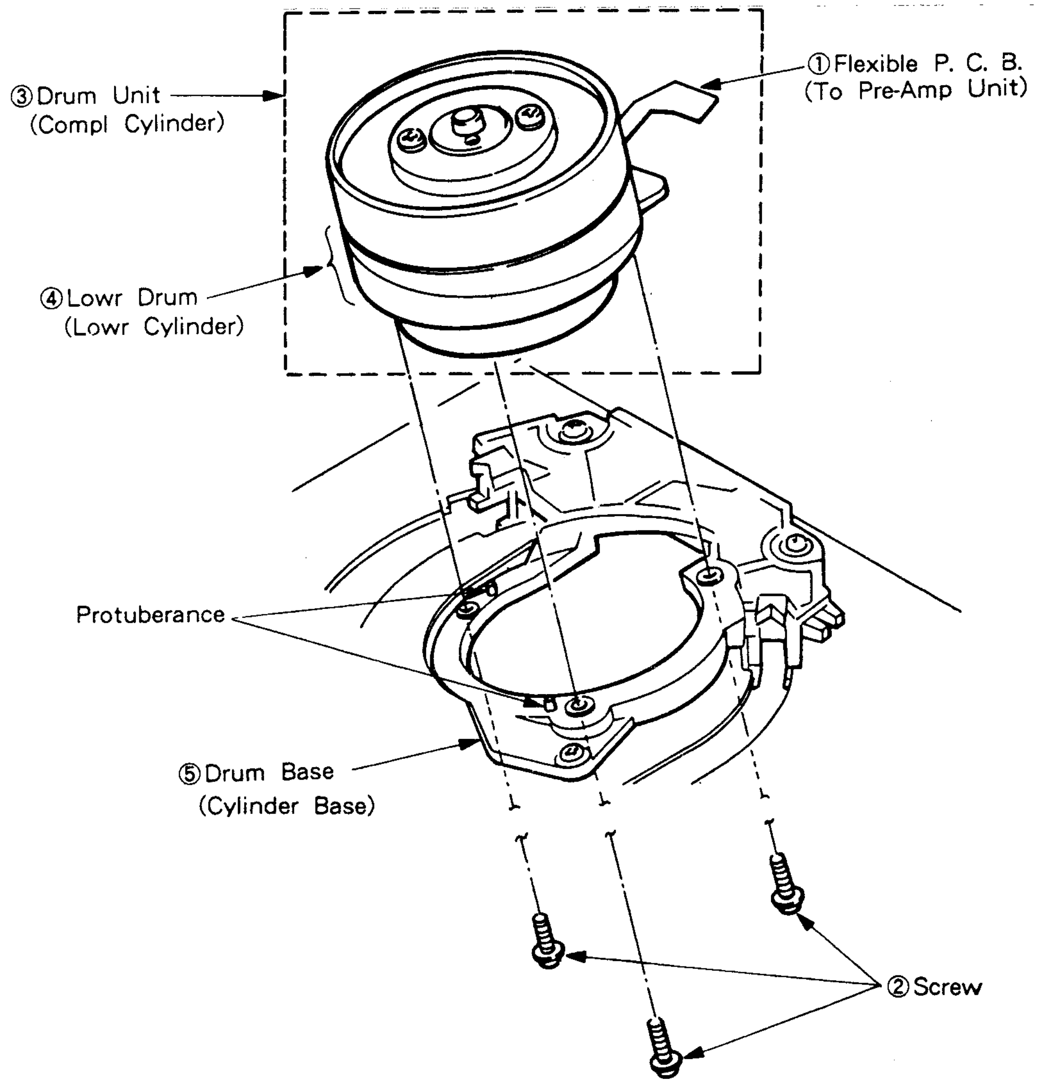

③Drum Unit
(Compl Cylinder)
①Flexible P. C. B.
(To Pre-Amp Unit)
④Lowr Drum
(Lowr Cylinder)
Protuberance
⑤Drum Base
(Cylinder Base)
②Screw

Fig. 5-11-2 Drum Unit (Compl Cylinder)

5-11-3. Upper Drum (Upper Cylinder)

1. Removal

1) Remove the two screws ① (see Fig. 5-11-3).
2) In case the RE (ROTARY ERASE) HEAD is attached to the upper drum (UPPER CYLINDER), remove the lead wires soldered from the P.C. board (see Fig. 5-11-4.).
3) Turn the head removing jig (VHJ-0041) handle ② counterclockwise to lift up the stopper ③ (see Fig. 5-11-5.).
4) Insert the two long screws ④ of the jig into the screw holes ⑥ located on the head chip side of the upper drum (UPPER CYLINDER) ⑤, then mount by turning the handle clockwise.
5) While holding the jig so that the upper drum ⑤ does not rotate, turn the handle ② clockwise to remove the upper drum.
6) Remove the jig from the upper drum.

Note : Handle parts carefully to protect the drum from scratches and dirt, and the video head from damage.

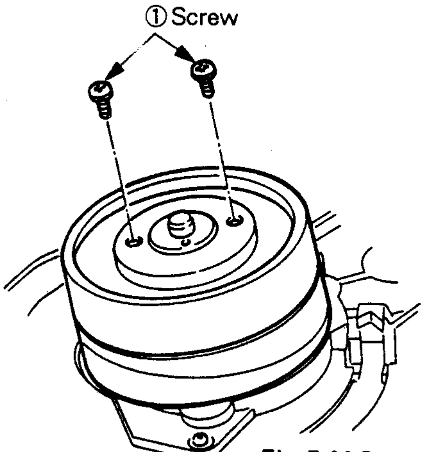


Fig. 5-11-3

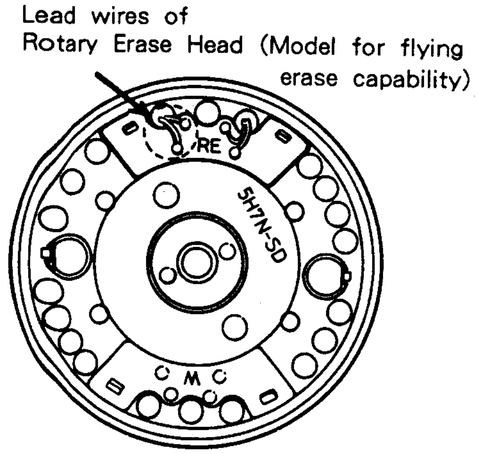

Lead wires of
Rotary Erase Head (Model for flying erase capability)
RE
5H7N-SD
C M C

Fig. 5-11-4

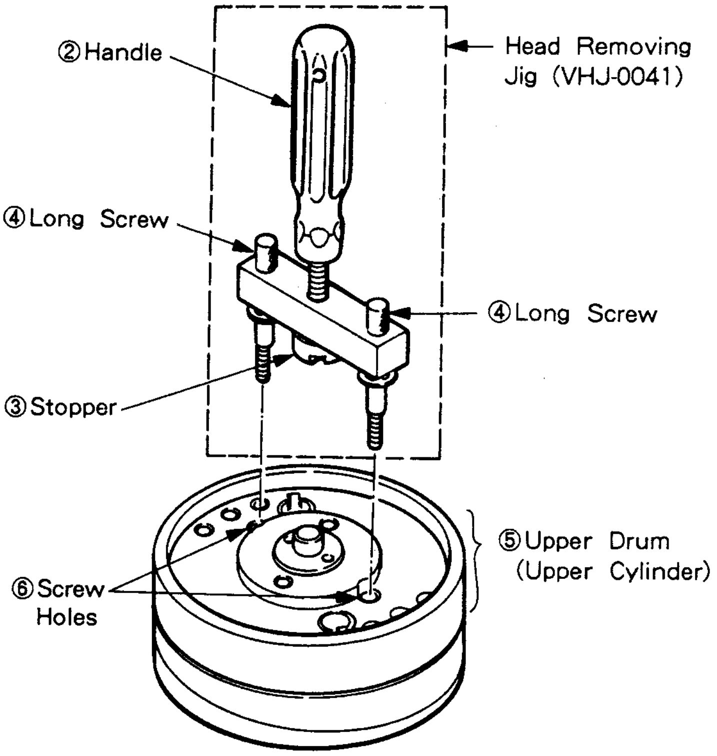

② Handle
Head Removing
Jig (VHJ-0041)
④ Long Screw
④ Long Screw
③ Stopper
⑤ Upper Drum
(Upper Cylinder)
⑥ Screw
Holes

Fig. 5-11-5

Upper Drum (Upper Cylinder)

2. Remounting (See Fig. 5-11-6.)

1) Confirm that surfaces where the flywheel and the upper drum (UPPER CYLINDER) are engaged or make contact portion are free from scratches and dirt.
2) The code name ① of the drum is printed on the video head side of the upper drum ⑤ SP CH-1 (channel A, plus azimuth). The code name ① is set with in the rotary transformer terminal round hole side ② position of lower drum (LOWER CYLINDER), so that the two screw holes ③ of the upper drum are aligned with the two screw holes ④ of the flywheel. (Refer to 3. Recognizing the SP CH-1 Head side).
3) In case the RE (ROTARY ERASE) HEAD is attached to the upper drum, pass the lead wires through the lead wire hole. (See Fig.5-11-4.)
4) While keeping the upper drum ⑤ parallel to the lower drum (LOWER CYLINDER) ⑧, insert it completely into the flywheel.
5) Temporarily tighten the two screws ⑦ alternately a little at a time, then tighten them to a torque of 6kg-cm using a torque driver (VHJ-0014) and a 3mm bit (VHJ-0045).
6) In case the RE head is attached to the upper drum ⑤, solder the lead wires to the P.C. board. Solder the red lead wire to the R terminal, and the yellow lead wire to the Y terminal.

Note : When the upper drum has been replaced, perform a tape path adjustment as instructed in 6-4. and CH-1/CH-2 switching position adjustment of the servo circuit.

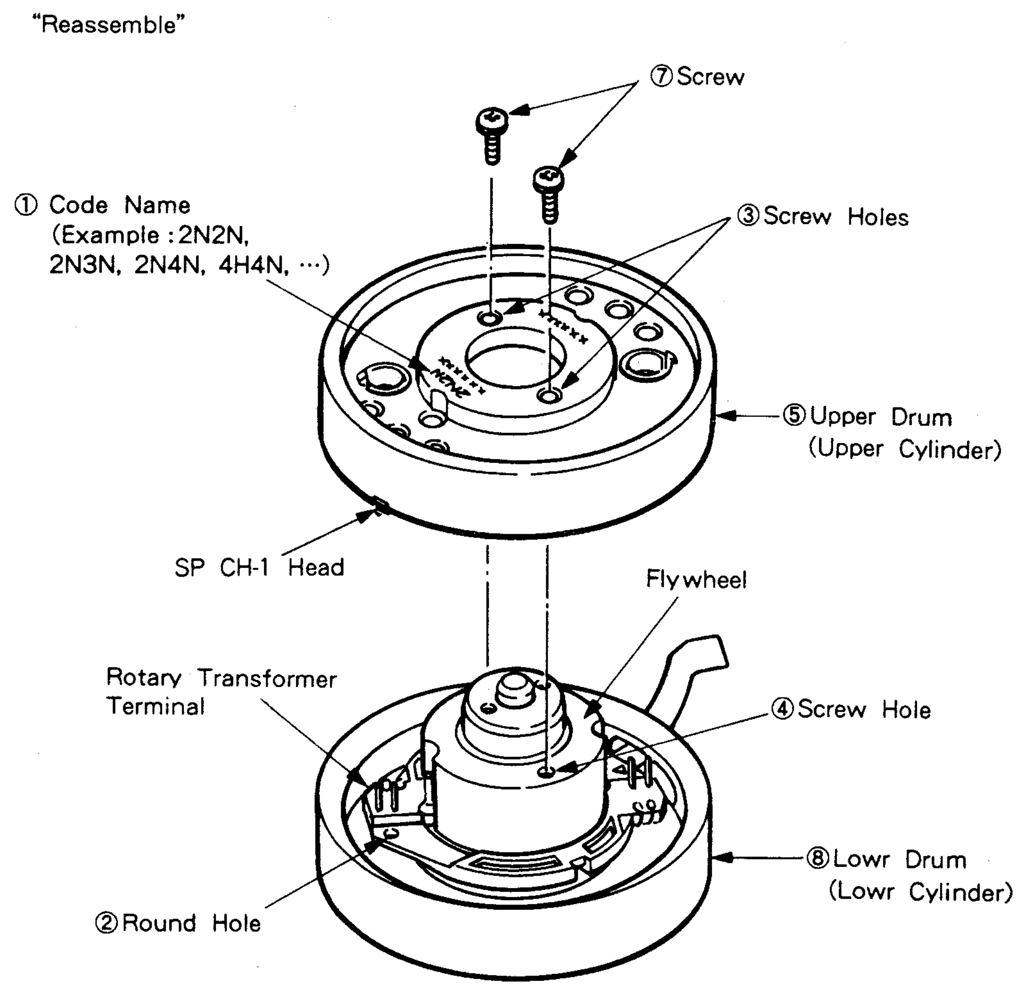

"Reassemble"
⑦Screw
① Code Name
(Example : 2N2N, 2N3N, 2N4N, 4H4N, …)
③Screw Holes
⑤Upper Drum
(Upper Cylinder)
SP CH-1 Head
Flywheel
Rotary Transformer Terminal
④Screw Hole
⑧Lowr Drum
(Lowr Cylinder)
②Round Hole

Fig. 5-11-6.

3. **Recognizing the SP CH-1 Head Side**
No playback picture can be obtained if the video head is not wired as a pair with the rotary transformer located inside the lower drum rotating section. Therefore, mounting position should be matched when mounting the upper drum. In the P90 mechanism series, the code name of the drum is printed on the SP CH-1 (CH-A, plus azimuth) side as a mark for mounting the upper drum. (See Fig. 5-11-7.) This code name differs according to the drum type, but its basic form is as follows :

A = Number of head bases
B = "N" for normal audio
"H" for HI-FI audio
C = Number of heads
D = TV system ("N" or "P")
EF = Code for detailed classification. Depending on drum type, it can also be just one character, or a blank space.

Code Name Form
④Ⓗ④Ⓟ-ⒹⓈ
A B C D E F

Examples of Detailed Classification Codes
V = Head with level difference
D = Compatible with digital units
S = SVHS-compatible

Examples of Code Names
2N2P, 2N2P-L, 2N2P-V, 2N2P-D, 2N3P, 2N4P, 4H4P, 4H4P-D

Moreover, there is a round hole with marking purposes on the SP CH-1 (CH-A, plus azimuth) side of the lower drum rotary transformer terminal. As shown in Fig. 5-11-8, there are two types of rotary transformer terminals (the number of pins differs according to the number of heads).

Note : When ordering parts such as drums (CYLINDERS), do not use the code names ; always refer to the parts list and order with the specified part numbers.

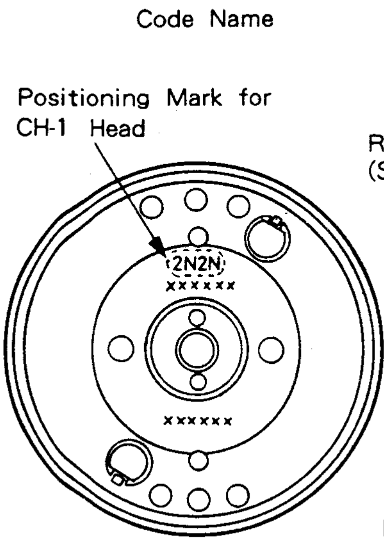

Code Name
Positioning Mark for CH-1 Head
2N2N
xxxxxx
xxxxxx

Fig. 5-11-7. Upper Drum

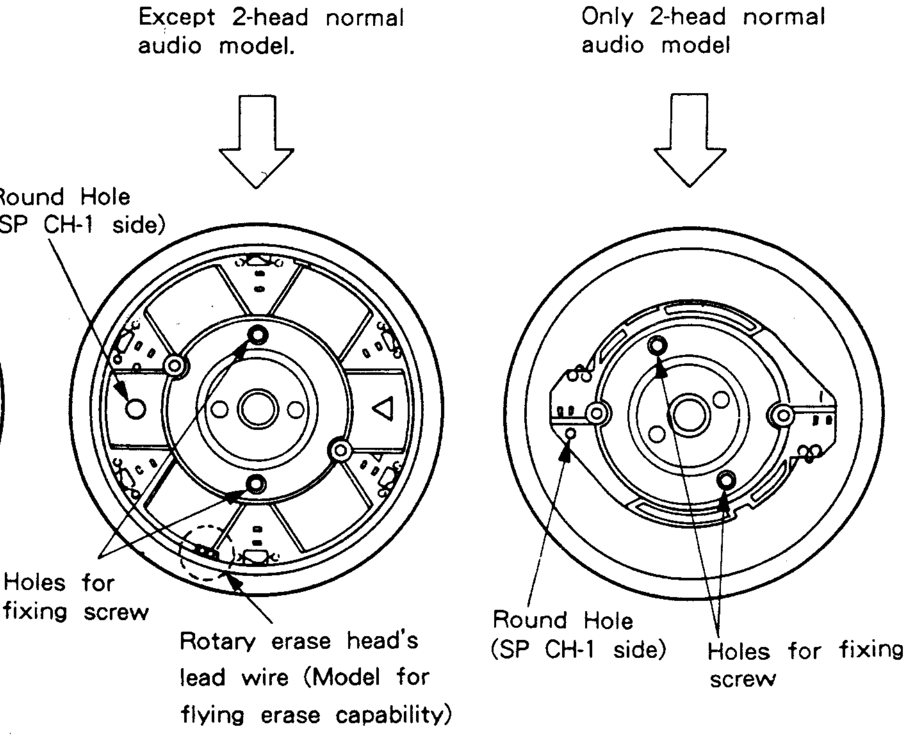
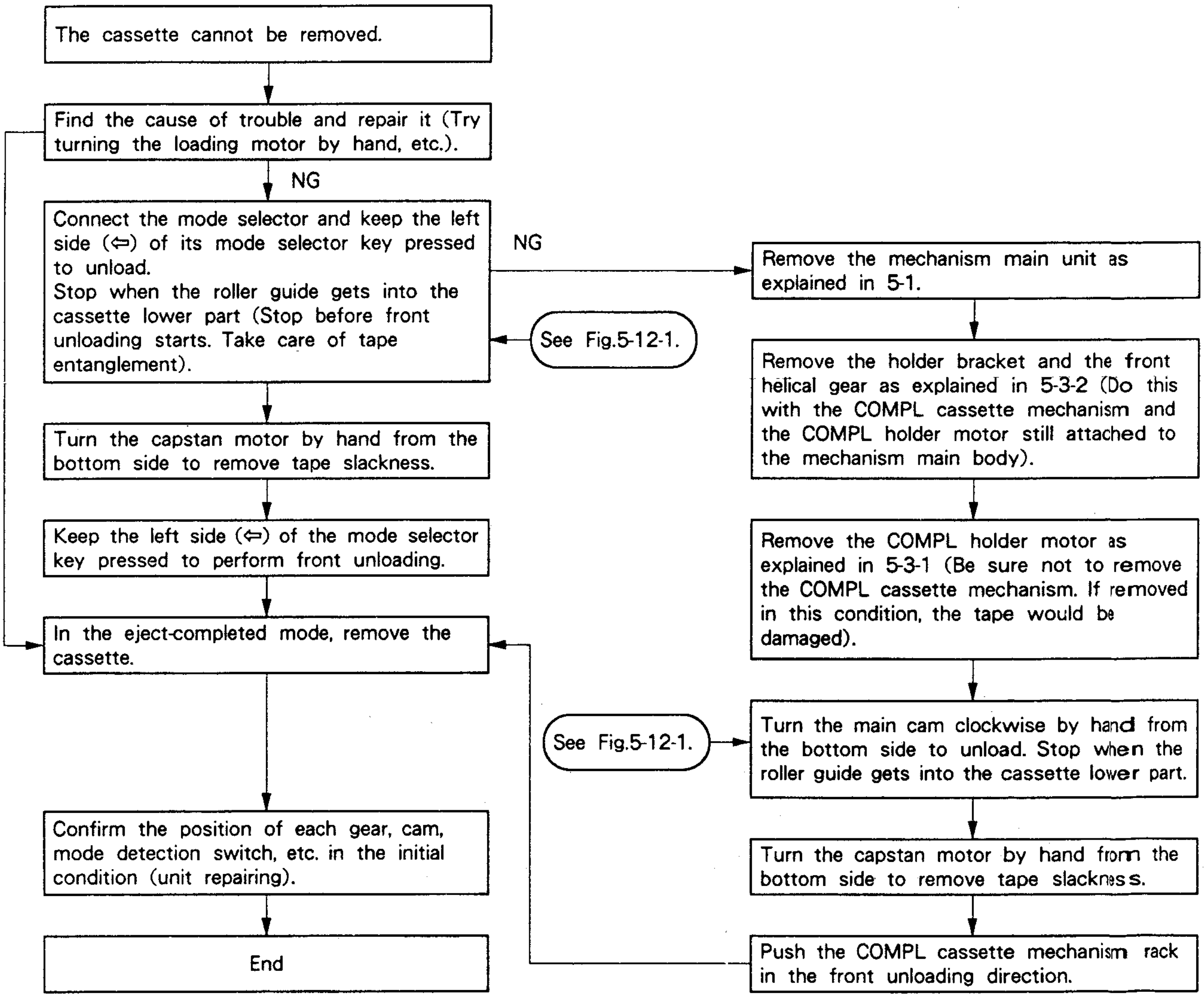

Except 2-head normal audio model.
Only 2-head normal audio model
Round Hole (SP CH-1 side)
Holes for fixing screw
Rotary erase head's lead wire (Model for flying erase capability)
Round Hole (SP CH-1 side)
Holes for fixing screw

Fig. 5-11-8. Lower Drum

5-12. HOW TO PROCEED WHEN THE CASSETTE CANNOT BE REMOVED



The cassette cannot be removed.

Find the cause of trouble and repair it (Try turning the loading motor by hand, etc.).

NG

Connect the mode selector and keep the left side (⇦) of its mode selector key pressed to unload.
Stop when the roller guide gets into the cassette lower part (Stop before front unloading starts. Take care of tape entanglement).

See Fig.5-12-1.

Turn the capstan motor by hand from the bottom side to remove tape slackness.

Keep the left side (⇦) of the mode selector key pressed to perform front unloading.

In the eject-completed mode, remove the cassette.

Confirm the position of each gear, cam, mode detection switch, etc. in the initial condition (unit repairing).

End

NG

Remove the mechanism main unit as explained in 5-1.

Remove the holder bracket and the front helical gear as explained in 5-3-2 (Do this with the COMPL cassette mechanism and the COMPL holder motor still attached to the mechanism main body).

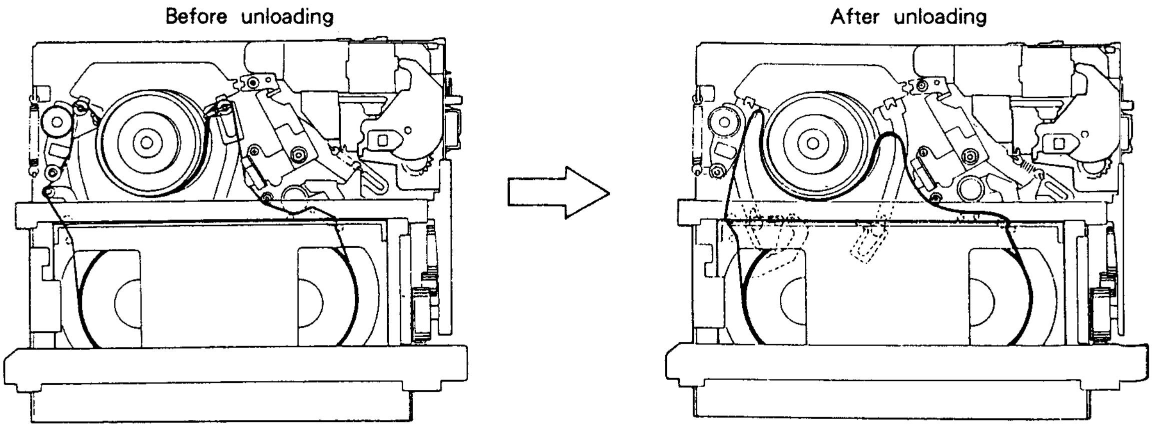
Remove the COMPL holder motor as explained in 5-3-1 (Be sure not to remove the COMPL cassette mechanism. If removed in this condition, the tape would be damaged).

See Fig.5-12-1.

Turn the main cam clockwise by hand from the bottom side to unload. Stop when the roller guide gets into the cassette lower part.

Turn the capstan motor by hand from the bottom side to remove tape slackness.

Push the COMPL cassette mechanism rack in the front unloading direction.



Before unloading

After unloading

Perform unloading using the mode selector.

First rotate the capstan motor by hand from the bottom to take-up the tape slack, and perform front-unloading using the mode selector.

Fig. 5-12-1

6. MECHANISM ADJUSTMENT

6-1. OPERATING THE MECHANISM WITH NO CASSETTE INSERTED (See Fig. 6-1-1.)

1) Attach black vinyl tape to the T. END and T. TOP sensors to prevent light from entering.
2) Push the TRAY LOCK LEVER in the direction of the arrow to maintain the unlocked condition. Release the lever just before the TRAY starts moving down.
3) In this condition, operation is possible in every mode. However, the following procedures are necessary to operate the unit in the REW and R-SEARCH modes.

REW／R-SEARCH : After pressing the REW button, turn the TAKE-UP REEL ASS'Y by hand. Otherwise, the reel sensor will operate, setting the INITIAL mode after 2 to 3 seconds.

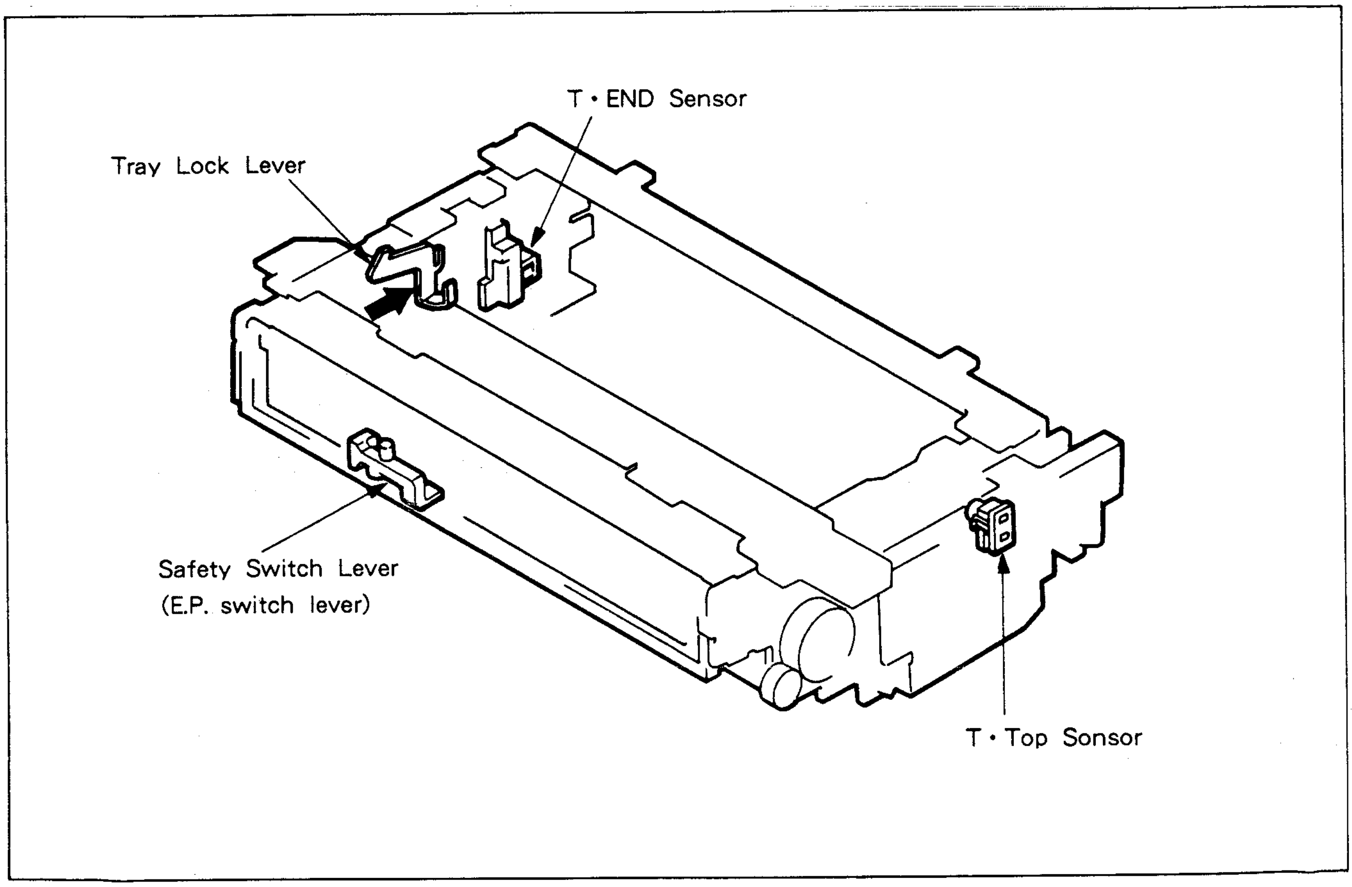

T • END Sensor
Tray Lock Lever
Safety Switch Lever
(E.P. switch lever)
T • Top Sonsor

Fig. 6-1-1. Preparations for Adjustment

6-2. REEL TABLE HEIGHT ADJUSTMENT AND TORQUE CHECK

6-2-1. Reel Table Height (See Fig. 6-2-1.)

If the SUPPLY REEL ASS'Y or the TAKE-UP REEL ASS'Y is raplaced, it will be necessary to adjust the REEL TABLE height.

(1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1 of Service Manual.
(2) Attach the master plane (H-7099-279-H) and reel disc height jig (H-7099-038-H) in the direction of the arrows.
(3) Confirm that, when the gauge stops, the REEL TABLEs are not in contact with surface A of the plate and side of the REEL TABLEs are in contact with surface B.
(4) If the REEL TABLE is in contact with surface A, remove a spacer and check again.
(5) If the REEL TABLE is not in contact with surface B, add a spacer and check again.
(6) Remove the master plane.
(7) Set the EJECT mode with the mode selector.
(8) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1 of Service Manual.

Note:

- Adjust the reel table height by adding or removing spacers(0.13t, 0.25t, 0.3t, 0.4t and 0.5t)as appropriate so that the height meets the specifications. Use the same method for both the TAKE-UP REEL TABLE and the SUPPLY REEL TABLE.
  (The 0.5t washer is included as the standard washer for the SUPPLY REEL ASS'Y. The 0.4t washer is included as the standard washer for the TAKE-UP REEL ASS'Y.)
- If the height of the reel table is not within the specified value, the tape edge might be damaged as a result, or the tape path adjustment might not be possible to make.

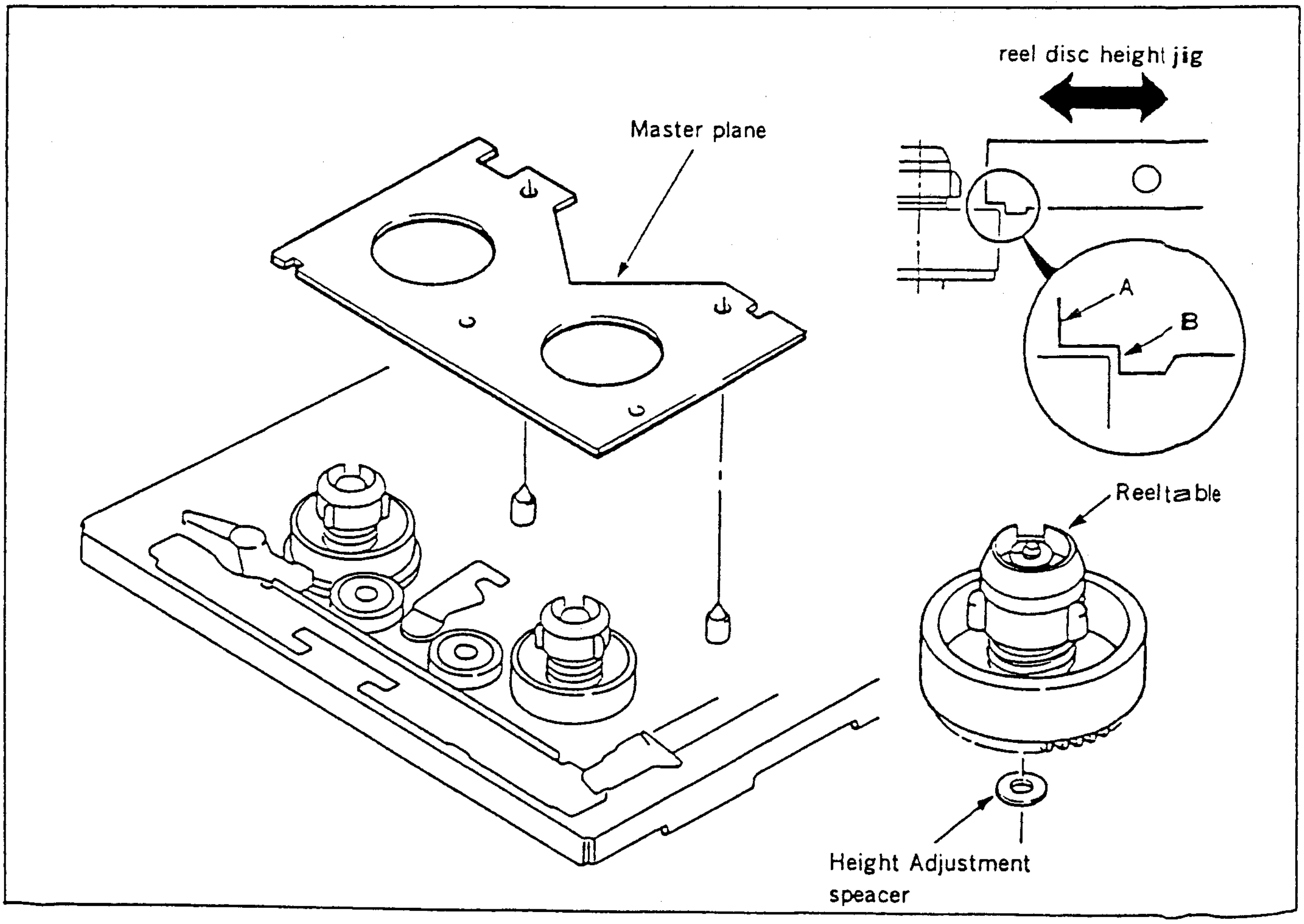


Fig. 6-2-1. Reel Table Height Adjustment

6-2-2. Torque Check (See Fig. 6-2-2.)

1) Set the unit to operating condition without a cassette inserted as instructed in 6-1.
2) Measure the SUPPLY REEL TABLE torque in the REW mode, and confirm that it is 750gcm or more. Perform this measurement keeping the torque gauge in a fixed position with your hand (locked torque).
3) Measure the TAKE-UP REEL TABLE torque in the F.FWD mode, and confirm that it is 600gcm or more (locked torque).
4) Measure the TAKE-UP REEL TABLE torque in the playback mode (SP tape speed), and confirm that it is within 100 through 160gcm (locked torque).
5) Measure the SUPPLY REEL TABLE torque in the REV (F-SEARCH) mode, and confirm that it is within 150 through 240 gcm (locked torque).
6) After confirming that torque readings are within the specifications for each mode, check the following :
   - ⓐ Dirt on the capstan motor and the REEL PULLEY groove.
   - ⓑ Deterioration of the REEL DRIVE BELT.
   - ⓒ Deterioration of the FRICTION GEAR ASS'Y felt (torque during playback).
   - ⓓ Wear and damage of the COMPL CLUTCH MECHANISM and the reel drive system gears.

Note1 : Items ⓑ, ⓒ and ⓓ require replacement if found defective.

Note2 : The measured value of torque during FF and REW represents the value 2 seconds after starting.

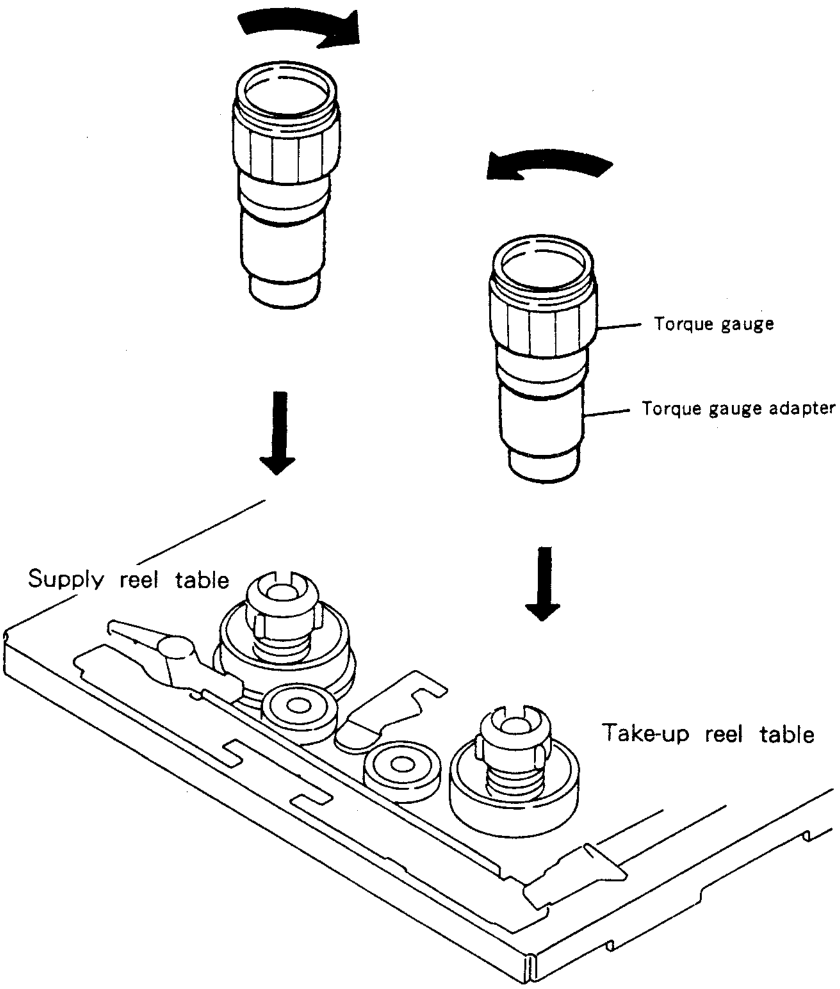


Fig. 6-2-2 Checking REW/FF/PLAY Torque

6-3. TENSION POLE (BACK TENSION GUIDE) POSITION ADJUSTMENT AND BACK TENSION TORQUE CHECK

6-3-1. Tension Pole (Back Tension Guide) Position Adjustment (See Fig. 6-3-1.)

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1 of Service Manual.
2) Set the PLAY mode with the mode selector (VHJ-0050)
3) Confirm that the space between the end of chassis and the Tension arm is from 4mm to 6mm.
4) In case the tension pole is not withim 4-6mm, adjust it by loosening the screw ④ a little and changing the mounting position of the BAND HOLDER ⑤ in the direction of the arrow Ⓐ.
5) Set the EJECT mode with the mode selector.
6) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1 of Service Manual.
7) Confirm that back tension torque is within 42± 5gcm, as instructed in 6-3-2 below.

6-3-2. Back Tension Torgue Chack (See Fig. 6-3-1.)

1) Attach the cassette torquemeter (VHJ-0016) and set the PLAY mode.
2) Confirm that back tension torque is within 42± 5gcm.
3) In case back tension torque dose not meet the above specification, proceed as follows:

ⓐ Clean the portion where the brake band (BAND HOLDER ASS'Y) ⑦ of the SUPPLY REEL ASS'Y ⑥ makes contact.

ⓑ Confirm that the brake band of the BAND HOLDER ASS'Y ⑦ does not make wear and that it is clean. If wear or dirt is found, replace the band holder assembly ⑦ as instructed in 5-7-3 of Service Manual.

ⓒ Raplace the TENSION LEVER ASS'Y SPRING COIL ⑧.

Note : Always follow procedures in 6-3-1. Tension Pole Position Adjustment after performing ⓐ, ⓑ and ⓒ.

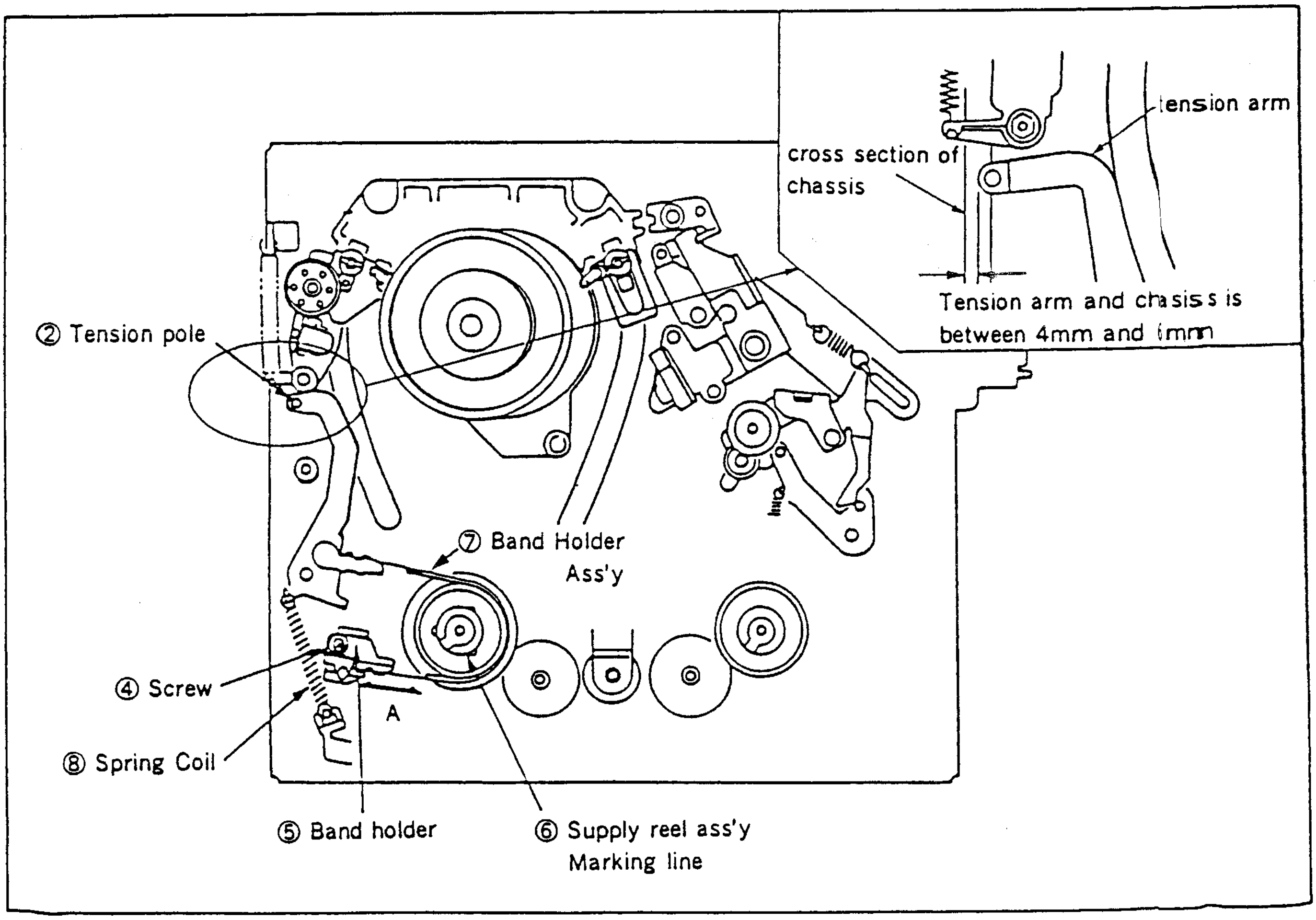

tension arm
cross section of chassis
Tension arm and chasiss is between 4mm and 6mm
② Tension pole
⑦ Band Holder Ass'y
④ Screw
⑧ Spring Coil
A
⑤ Band holder
⑥ Supply reel ass'y
Marking line

Fig. 6-3-1. Tension Pole Positioning Adjustment

6-4. TAPE PATH ADJUSTMENT

The tape path mechanism is precisely adjusted at the factory. Normally no readjustment is required, but checking and/or adjustment is necessary when parts of the tape path mechanism among those shown in the figure below (See Fig. 6-4-1.) have been removed or replaced after a long period of use.
This operation consists of adjusting the various guides so that the tape drawn out from the supply reel runs smoothly along the DRUM (CYLINDER) lead surface. A way of grasping the tape path condition by electronic means is monitoring the video head output envelope waveform with an oscilloscope. However, the fact that visual observation is essential in order to know whether the tape is running through the various guides in a smooth and natural way should be kept in mind when checking and adjusting.
Also remember that the position of tape guides is not greatly affected by the replacement of the UPPER DRUM (UPPER CYLINDER) or the COMPL DRUM (COMPL CYLINDER), provided that it is correctly performed, and that only the replaced parts should be adjusted after replacing a tape guide or COMPL HEAD BRACKET, since the position of the other tape guides shall not change considerably.

6-4-1. Preparations for Adjustment

(1) Clean the tape transport surfaces (See Fig. 6-4-1.).
(2) Connect the oscilloscope. Connect the channel 1 probe to the envelope waveform test point, and the channel 2 probe to the SW30 (RF SW P) test point. During adjustment, apply a trigger to the low side of the SW30 (RF SW P) in order to monitor the waveform output from channel 1 of the video head.

Note : Since oscilloscope connection points differ according to the model, refer to the "Test Point for Tape Path Adjustment" allocation figure in the electric circuit adjustment section of the service manual book.

(3) Use a dentist's mirror for visual observation of tape path condition.
(4) Use a nut box (VHJ-0048) for adjustment of the fixed guides.
(5) Use an eccentric driver (VHJ - 0003) for adjustment of the guide rollers.
(6) When adjusting height of the fixed guide, guide rollers or COMPL head bracket, turn the special nut or the upper flange clockwise to push the tape downward, and counterclockwise to make the tape rise up.
(7) Do not use the damaged cassette tapes for tape path adjustment.

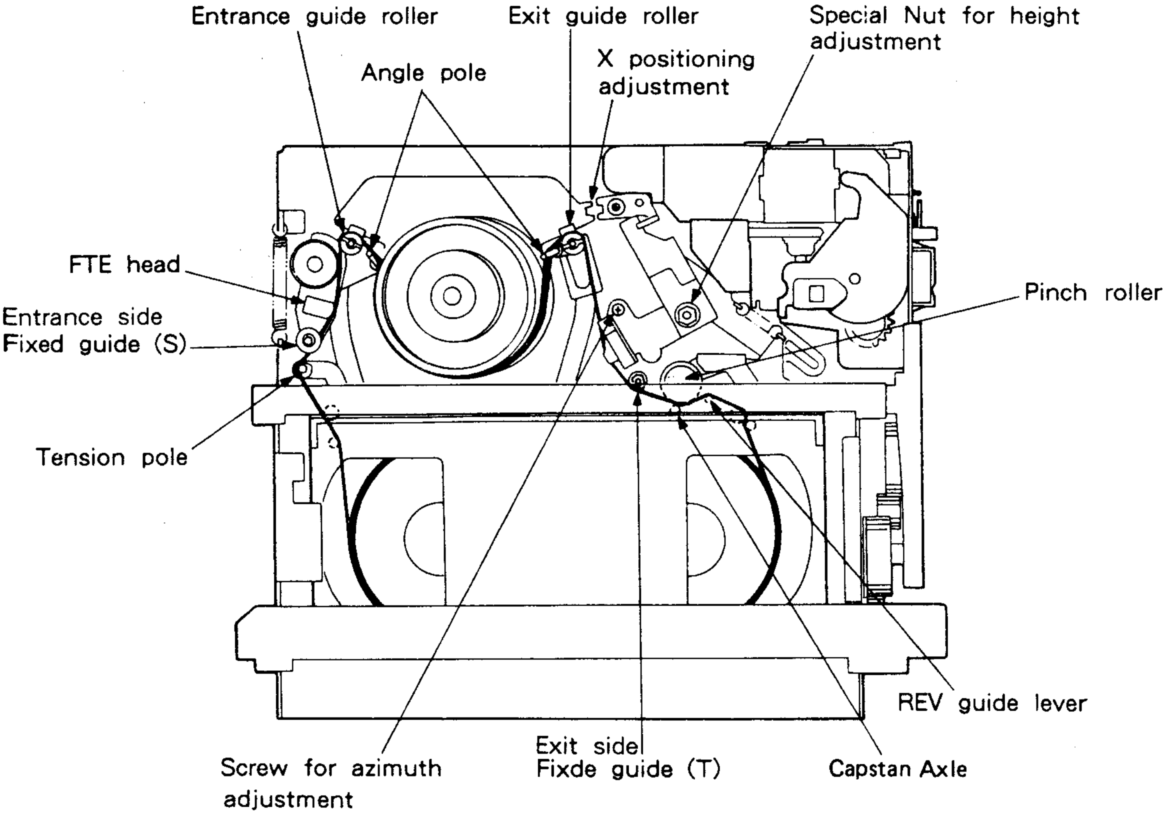

Entrance guide roller
Angle pole
Exit guide roller
X positioning adjustment
Special Nut for height adjustment
FTE head
Entrance side Fixed guide (S)
Tension pole
Pinch roller
REV guide lever
Screw for azimuth adjustment
Exit side Fixde guide (T)
Capstan Axle

Fig. 6-4-1. Preparation for Adjustment

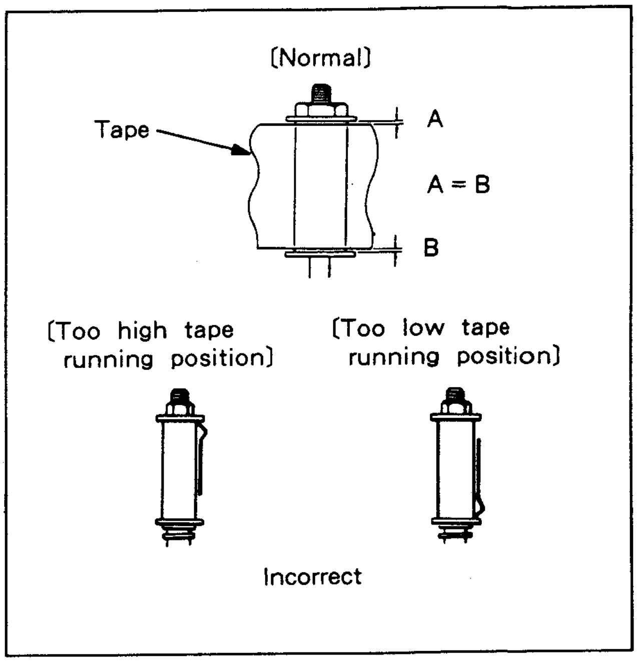
6-4-2. Adjustment by Visual Observation after Guide Roller, Fixed Guide or COMPL Head Bracket Replacement

Perform this adjustment after removing or replacing any of the above parts. Only for the replaced or removed parts, play back an alignment tape (VHJ-0009) beforehand and adjust height by visual observation.

(1) Exit Side Fixed Guide (See Fig. 6-4-2.)
Adjust so that the tape upper edge does not make contact with the fixed guide upper flange, and the tape lower edge does not make contact with the fixed guide lower flange. Gaps A and B should remain equal.

(2) Guide Rollers (See Fig. 6-4-3.)
The tape should not be curled by the guide roller upper and lower flanges. It should also run smoothly, without moving up and down on the DRUM (CYLINDER) lead surface.

Note : An excessive guide roller pressure may cause tape damage.


[Normal]
Tape
A
A = B
B
[Too high tape running position]
[Too low tape running position]
Incorrect

6-4-2. (1) Pre-set For Exit Side Fixed Guide

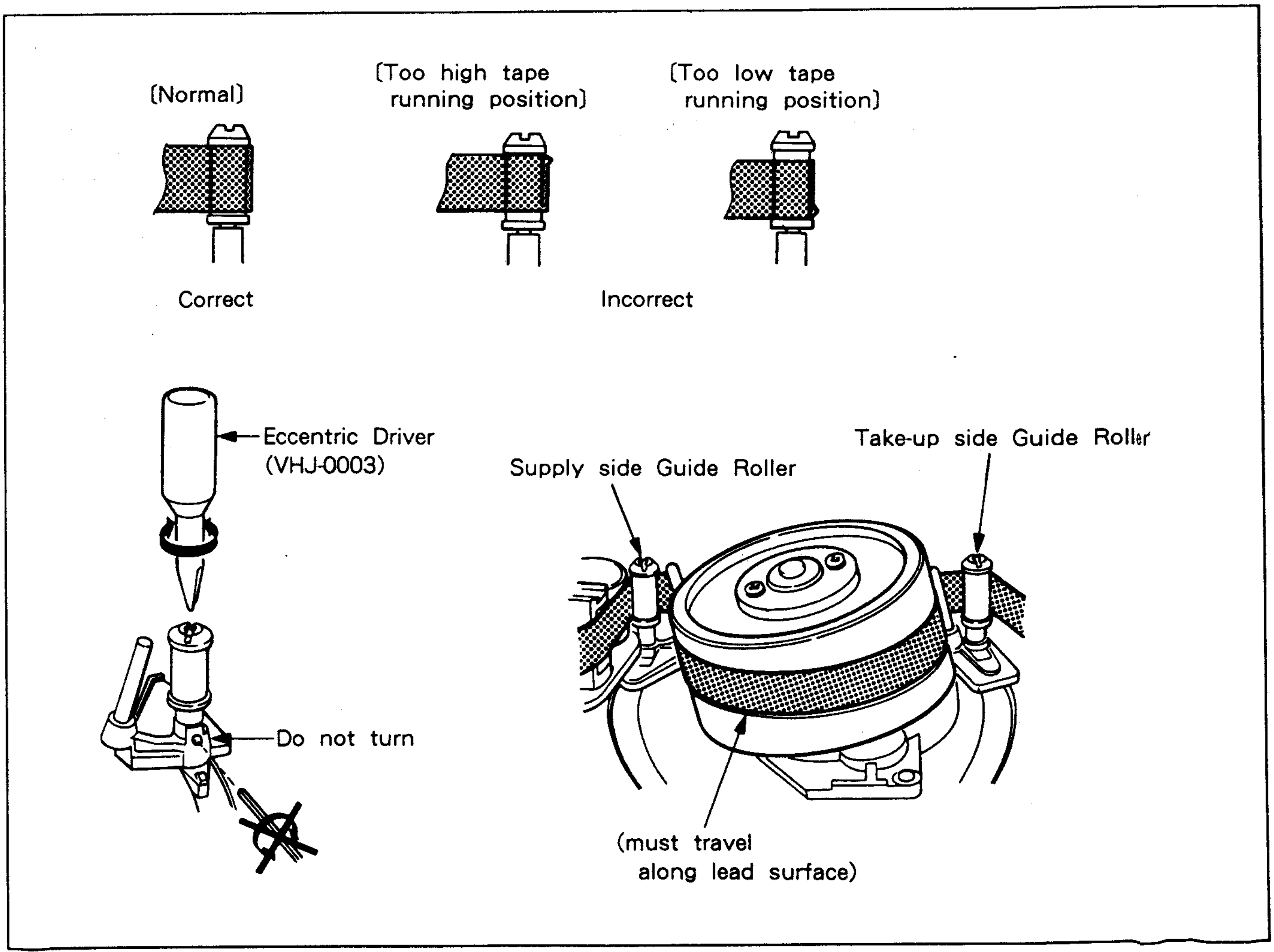

[Normal]
[Too high tape running position]
[Too low tape running position]
Correct
Incorrect
Eccentric Driver (VHJ-0003)
Do not turn
Supply side Guide Roller
Take-up side Guide Roller
(must travel along lead surface)

Fig. 6-4-3. (2) Pre-set for Guide Roller

(3) COMPL Head Bracket (ACE Head) (See Fig. 6-4-4.)
Adjust the special nut so that the tape edge runs between the audio head upper end and the control head lower end. Gaps A and B should be of about the same width. Since at this point it is only required that the control signal is picked up and the servo circuit works normally, no adjusting screws except the COMPL head bracket special nut should be touched.

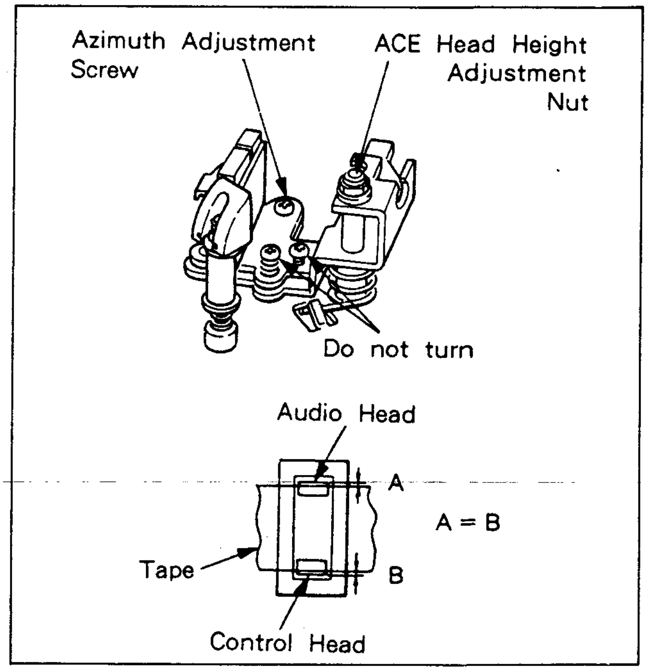


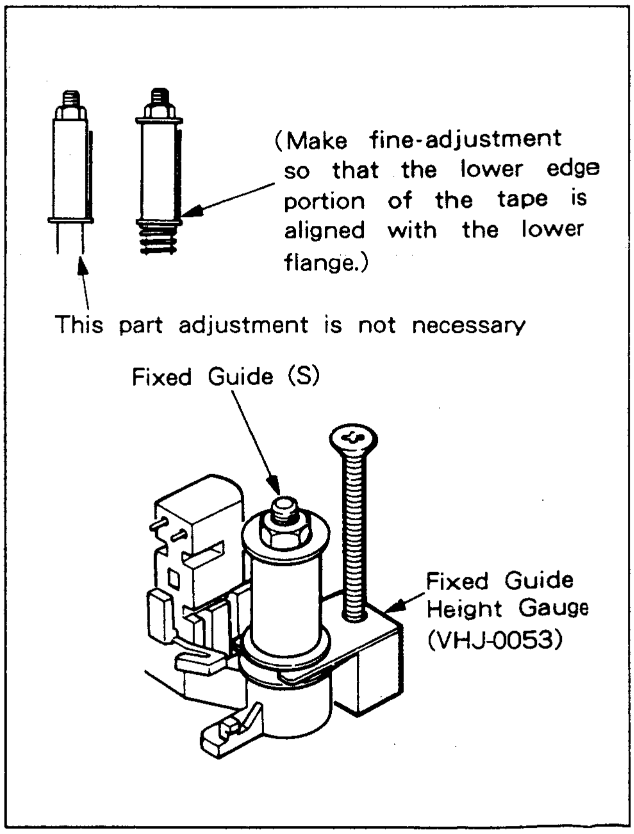
Fig. 6-4-4. (3) **Pre-set for Compl Head Bracket**

6-4-3. Entrance Side Fixed Guide (S) Height Adjustment (See Fig. 6-4-5.)

The P90 mechanism entrance side fixed guide comes in two types ; the one in this unit is equipped with an upper flange and a spring coil, and it requires height adjustment. The other type is not provided with an upper flange and a spring coil. Height is naturally set when the special nut is fastened, so adjustment is not required.

For units with an upper flange, perform height adjustment as explained below. Even for types which do not require height adjustment, check whether the lower tape edge runs along the lower flange. Be careful not to fasten the special nut excessively, causing the axle to run idle.

1) Rotate the fixed guide (S) counterclockwise to lift the tape somewhat, then insert the fixed guide height gage (VHJ-0053) into the lower side of the fixed guide (S) lower flange.
2) Rotate the fixed guide (S) special nut clockwise a little at a time until the lower flange makes contact with the upper surface of the fixed guide height gage, causing a slight drag.
3) After rotating the special nut 90° counterclockwise, remove the fixed guide height gauge.
4) After adjusting the guide rollers in section 5-4-4, play back the alignment tape (VHJ-0009). Confirm that the tape lower edge runs in close contact with the fixed guide (S) lower flange. In case too much pressure has left a gap between the tape and the lower flange, or excessive lifting has caused curling of the tape lower edge, perform fine adjustment. However, do not adjust the special nut beyond 90° clockwise and 45° counterclockwise.


(Make fine-adjustment so that the lower edge portion of the tape is aligned with the lower flange.)

This part adjustment is not necessary

Fig. 6-4-5. Entrance Side Fixed Guides

6-4-4. Guide Roller Adjustment (See Fig. 6-4-6.)

1) Play back the alignment tape (VHJ-0009), press the tracking control key and adjust the envelope waveform to the maximum level.
2) Loosen the entrance and exit guide rollers by rotating them counterclockwise, then rotate them clockwise alternately until they are fastened and a flat video output waveform is obtained.
3) Confirm that the envelope waveform is not deformed, and check visually that no curling occurs at the guide roller upper and lower flanges.
4) Press the tracking control key and set the envelope waveform level to approx. 50% of the maximum. In this condition, confirm whether the envelope waveform is flat. It will not, showing valleys or peaks at the first half (entrance) or second half (exit), if the guide roller pressure is excessive or insufficient.
   In case there is unevenness in the first half (entrance), adjust the entrance side guide roller. If the second half (exit) shows trouble, adjust finely the exit side guide roller.

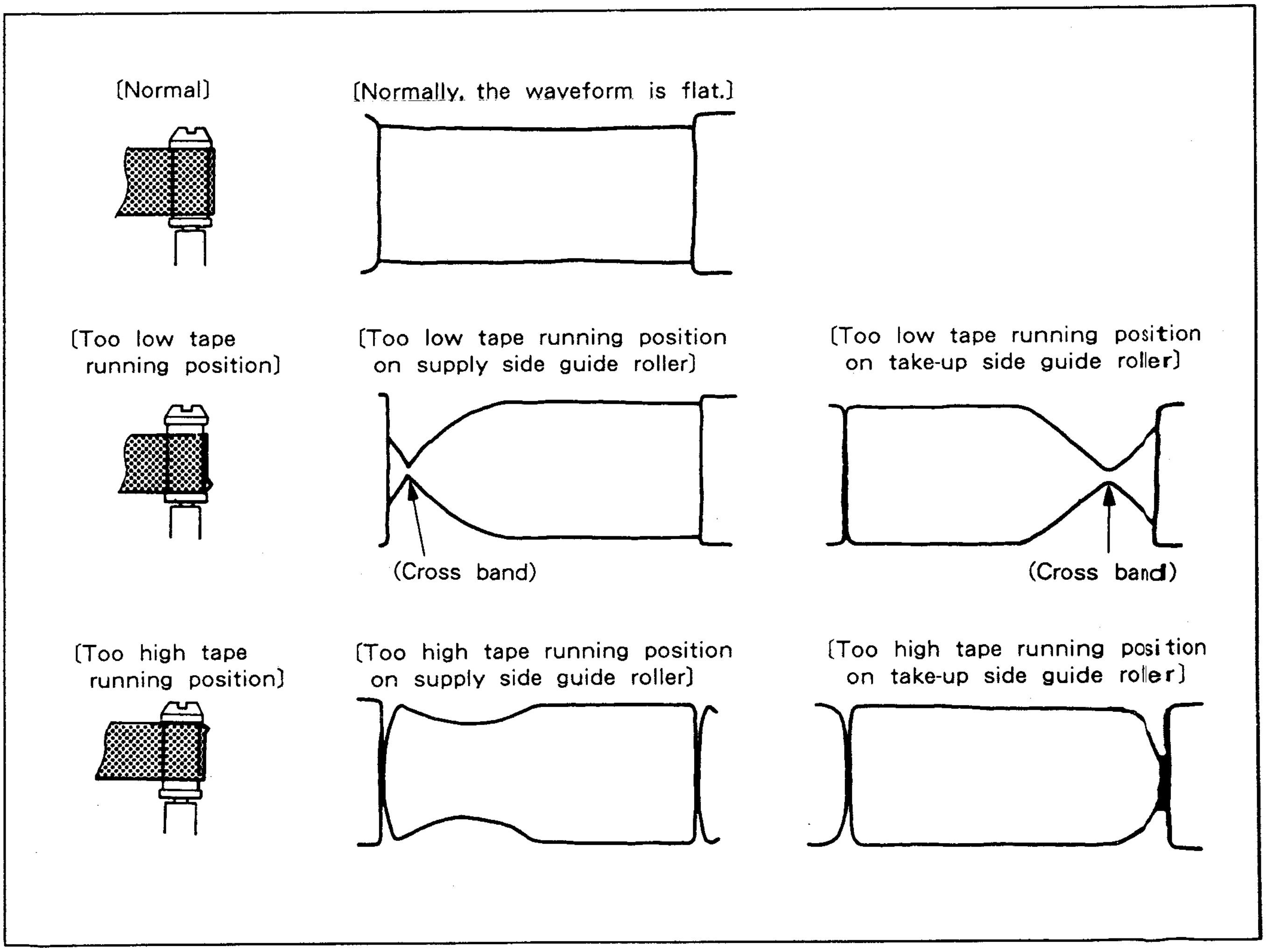

(Normal)
(Normally, the waveform is flat.)
(Too low tape running position)
(Too low tape running position on supply side guide roller)
(Too low tape running position on take-up side guide roller)
(Cross band)
(Cross band)
(Too high tape running position)
(Too high tape running position on supply side guide roller)
(Too high tape running position on take-up side guide roller)

Fig. 6-4-6. Guide Roller Adjustment

6-4-5. Exit Side Fixed Guide (T) Adjustment (See Fig. 6-4-7.)

1) Load the alignment tape (VHJ-0009) and set the PLAY mode.
2) Rotate the special nut counterclockwise so that the lower flange lifts the tape until its lower edge is slightly curled.
3) Rotate the special nut clockwise a little at a time until curling of the tape lower edge is removed.
4) Confirm at each mode (PLAY, F.SEARCH, R. SEARCH, F.F and REW) that the tape runs along the lower flange and that no curling occurs.

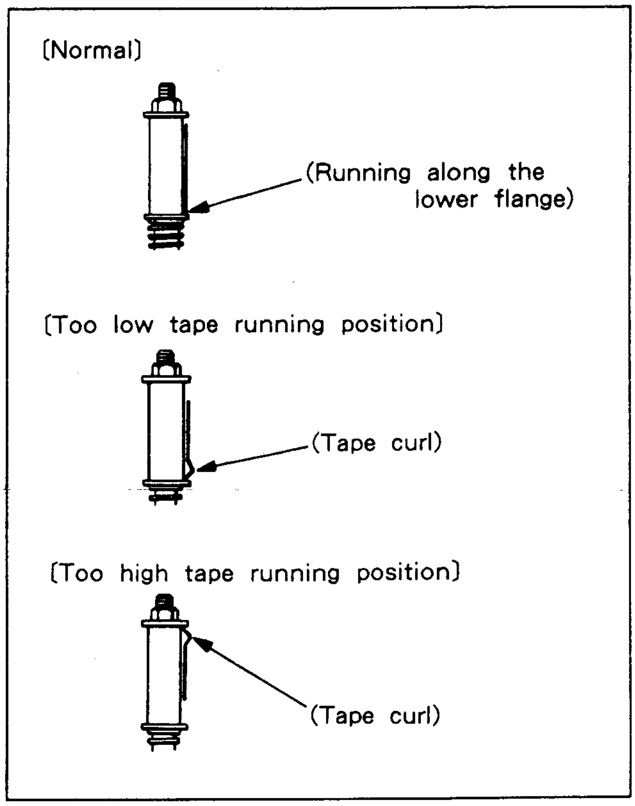

[Normal]
(Running along the lower flange)
[Too low tape running position]
(Tape curl)
[Too high tape running position]
(Tape curl)

Fig. 6-4-7. Fixed Guide (T)

6-4-6. COMPL Head Bracket (ACE Head) Adjustment

(1) Height Adjustment and Azimuth Adjustment (See Fig. 6-4-8.)

1) Load the alignment tape (VHJ-0009) and set the PLAY mode.
2) Monitor the audio output waveform with the oscilloscope.
3) Rotate the azimuth adjustment screw until the audio output waveform amplitude is maximum.
4) After loosening the ACE head height adjustment special nut, rotate it slowly clockwise until amplitude of the audio output waveform is maximum, then adjust it finely clockwise to the point just before the said waveform amplitude begins to decrease.
5) Rotate the azimuth adjustment screw until amplitude of the audio output waveform is maximum.
6) Confirm that the audio output waveform amplitude does not fluctuate.

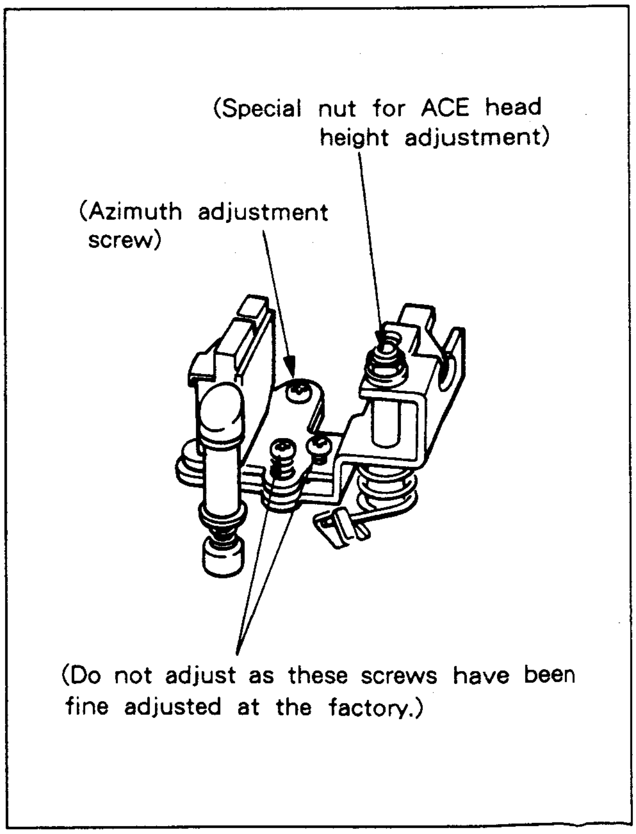

(Special nut for ACE head height adjustment)
(Azimuth adjustment screw)
(Do not adjust as these screws have been fine adjusted at the factory.)

Fig. 6-4-8. Compl Head Bracket

(2) Tracking (X Value) Adjustment (See Fig. 6-4-9.)

1) Load the alignment tape (VHJ-0009) and set the PLAY mode.
2) Set tracking to the center position with the tracking control key (See Note below).
3) Rotate the stopper bracket fixing screw 180° counterclockwise.
4) Monitor the video head output envelope waveform with the oscilloscope.
5) Adjust the stopper bracket position so that amplitude of the envelope waveform becomes maximum at the tracking center and the envelope waveform amplitude changes by the same amount when shifting the tracking center by pressing the plus (+) and minus (−) tracking control keys.
6) Tighten the fixing screw.
7) (Model for LP mode tape speed capability)
Playback the alignment tape (VHJ-0052) and set the tracking to the center using a tracking control key.
Then confirm that the playback picture on screen is normal. If not, Make readjustment by referring to items 1) through 7). To readjust, playback VHJ-0009 and finely adjust the position of the stopper bracket within the range in which the amplitude of the envelope waveform can be held to a maximum.
8) Perform servo circuit PB PHASE (Switching position) adjustment.

Note: For models equipped with auto tracking, always set to the manual tracking mode before adjustment. To confirm the tracking center position, press the tracking keys (+, −) and observe the front panel clock display. It will read "T − : −" at the tracking center, "T − : , T − − : " when keeping the minus (−) key pressed, and "T : −, T : − −" when keeping the plus (+) key pressed. The time indication will be restored 2 to 3 seconds after the tracking keys are released.

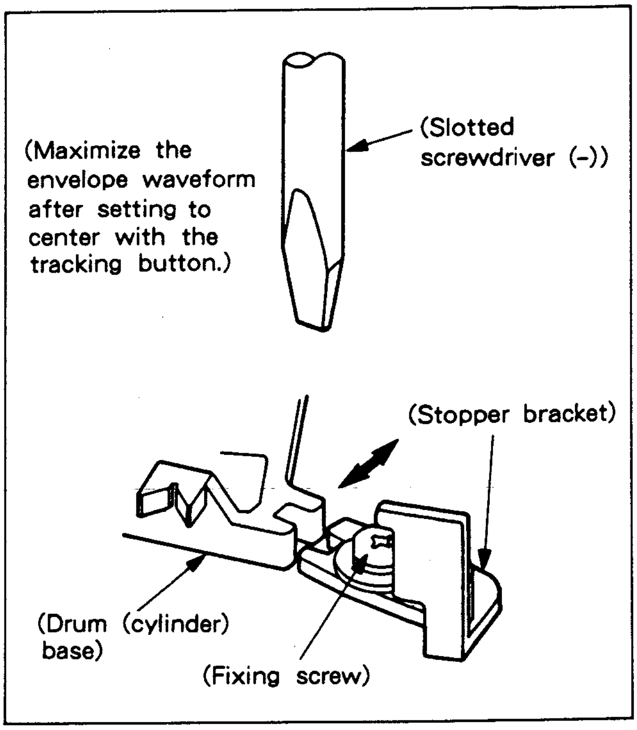

(Maximize the envelope waveform after setting to center with the tracking button.)
(Slotted screwdriver (-))
(Stopper bracket)
(Drum (cylinder) base)
(Fixing screw)

Fig. 6-4-9

6-4-7. Checking after Adjustment

Tape running may show a slight change depending upon the type of the cassette tape (thick or thin tape), the start, middle, or end of cassette tape winding, etc. After performing the tape path adjustment with use of an alignment tape, be sure to check the following points. Incidentally, the alignment tape to be used should be E-180 or E-240 cassette should be a good one without any damage to it.

(1) Try to play back the alignment tape (VHJ-0009) and confirm that the envelope waveform rise immediately and that there is no fluctuation in the envelope waveform and the audio output waveform.

(2) Load a cassette tape E-180 and start recording operation in the standard mode. 1 kHz should be fed to the audio input terminal when recording. After recording, the following points should be checked.

1. When the recorded portion is played back, the envelope waveform rise immediately, and no fluctuation in the envelope waveform is observed. Also, no speed drop occurs during the first half period or the last half period. Further, check to be sure that no fluctuation occurs in the audio waveform. Also confirm that neither the tape curling or derailing is caused on the upper or lower flange and the on the read side of the drum.
2. Confirm that no tape curling or derailing occurs in the upper or lower flange of each tape guide and the read side of the drum during each mode of operation, namely, FF, REW, F. SEARCH, and R. SEARCH.
3. Confirm that the envelope waveform rise immediately after changing the mode directly to the PLAY from each mode of FF, REW, F. SEARCH, R. SEARCH, or POWER OFF (INITIAL) and that no tape curling or derailing occurs in the upper or lower flange of the each tape guide and on the read side of the drum.

(3) Load a E-240 cassette tape and perform recording operation in the SP mode. 1 kHz should be fed to the audio input terminal when recording. Now, confirm that the envelope waveform rise immediately upon starting the playback of the recorded portion, and that neither fluctuation in the envelope waveform nor a speed drop occurs during the first half period or the last half period. Also confirm that no tape curling or derailing is caused in the upper or lower flange of each tape guide and on the drum lead surface.

(4) Perform recording for 60 seconds in the SP mode at the start of E-240 cassette winding. Play back the recorded portion and repeat the F.SEARCH ↔ R.SEARCH ten times, following which confirm that no damage is done to the tape edge. If any damage is found on the tape edge, a proper step must be taken as below depending upon the symptom obserbed.

1. When a sawtooth shaped damage is caused on underside of the tape edge by the REV guide
   1) Check to see if damage is done to the tape by the REV guide.
   2) Loosen the tilt adjustment screw of the ACE head bracket by turning it 135° counterclockwise.
   3) Make readjustment of the exit side fixing guide by referring to item 6-4-5.
   4) Make readjustment of the ACE head bracket (azimuth, height and adjustment of X value) by referring to item 6-4-6.
   5) Confirm that no fluctuation in the audio level is caused by loosening the tilt adjustment screw in steps 1) and 2) above. Move the screw a little back if any fluctuation is found (but never move it back to the original position). After adjusting the tilt adjustment screw is readjusted, perform steps 3) and 4) once again.
   6) Confirm again that the E-240 cassette tape does not sustain any damage.
   7) Perform the recording and playback on the E-180 and E-240 cassette tape and confirm that no fluctuation occurs in the envelope waveform and the audio waveform.

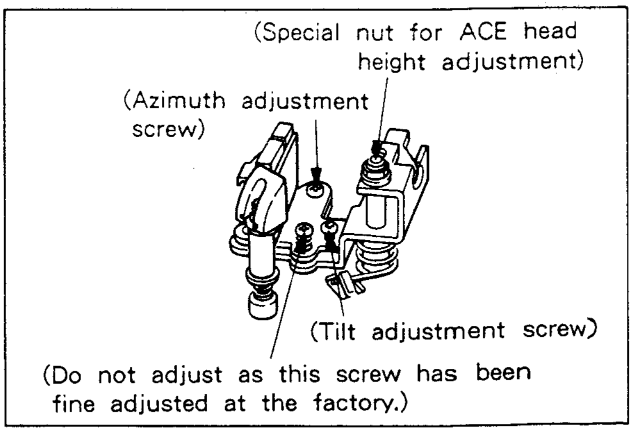

(Special nut for ACE head height adjustment)
(Azimuth adjustment screw)
(Tilt adjustment screw)
(Do not adjust as this screw has been fine adjusted at the factory.)

Fig. 6-4-10 Compl Head Bracket

2. If damage in the form of a sawtooth or a streak is found on the tape edge
   1) Check if a large amount of magnetic particles is adhered to the exit-side guide roller. If magnetic particles cannot be removed in spite of repeated cleaning, the guide roller must be replaced.
   2) Confirm if the tape is held too tightly by the exit-side guide roller, or if the last half of the envelope waveform is flat. If the type is found held too tightly, readjustment should be made by referring to 6-4-4.
   3) Recheck if the damage is still caused on the E-240 tape.
      If similar damage is still found on the tape, the exit-side guide roller should be loosened about 20° counterclockwise.
   4) Check once again that no fluctuation is caused in the envelope waveform or the audio waveform by loosening the exit-side guide roller. To do this, record and play back the E-240 cassette tape.

(5) Perform recording for 60 seconds in the SP mode at the near end of the E-240 cassette tape. Play back the recorded portion and repeat the F. SEARCH ↔ R. SEARCH ten times, following which a check should be made to see if damage is still done to the tape edge. If a damage in the form of a sawtooth or a streak is still occurred on the tape edge by the upper lounge of entrance side guide roller, proceed with the step given below.
   1) Check if a large amount of magnetic particles is adhered to the entrance-side guide roller. If the magnetic particles cannot be removed in spite of repeated cleaning, the guide roller must be replaced with new one.
   2) Confirm if the tape is held too tightly by the entrance-side guide roller, or if the first half of the envelope waveform is flat. If the tape is found held too tightly, readjustment should be made by referring to 6-4-4.
   3) Recheck if the damage is still caused on the E-240 tape.
      If the damage is still found on the tape, the entrance-sideguide roller should be loosened aboud 20° counterclockwise.
   4) Check once again that no fluctuation is caused in the envelop waveform or the audio waveform by looseving the entrance-side guide roller. To do this, record and play back the E-240 cassette tape.

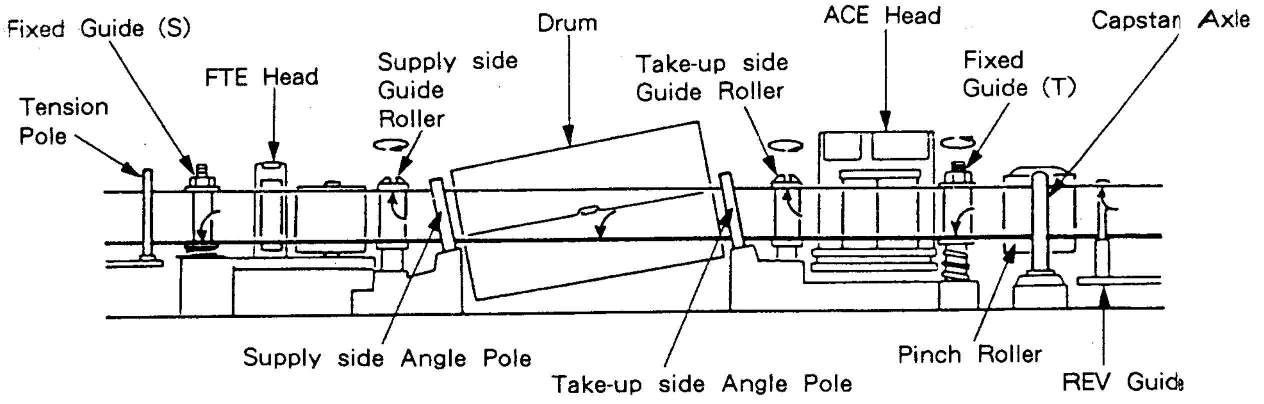
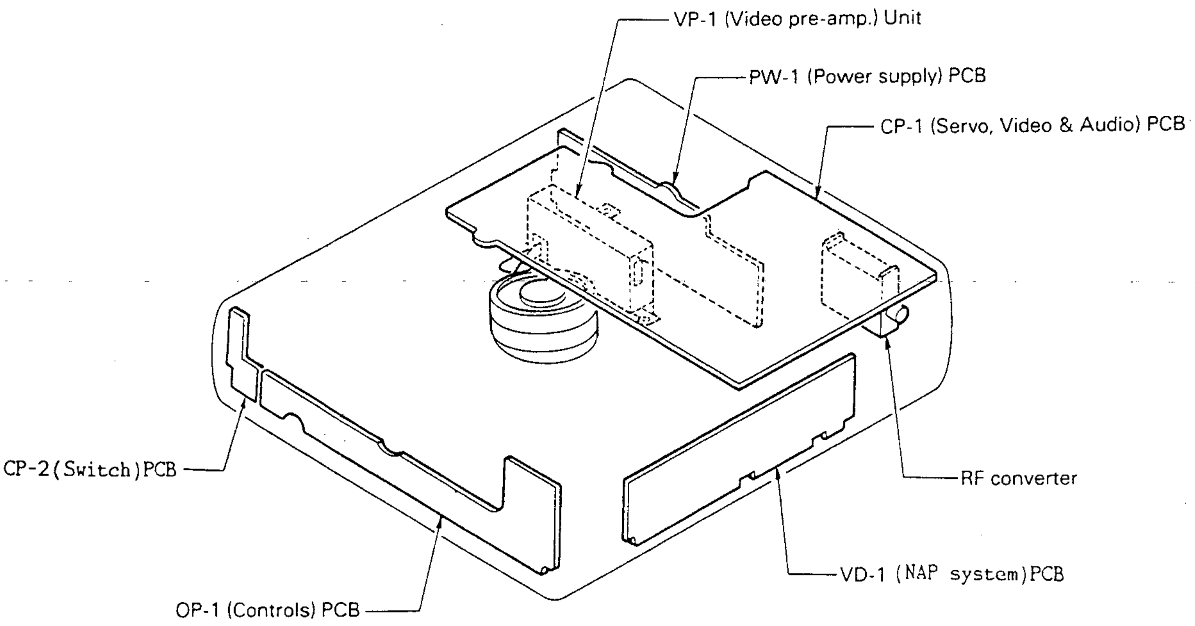


Fig. 6-4-11.

SECTION 6
ELECTRICAL ADJUSTMENTS

1. CIRCUIT BOARD LOCATIONS

1-1. MAIN BOARDS


VP-1 (Video pre-amp.) Unit
PW-1 (Power supply) PCB
CP-1 (Servo, Video & Audio) PCB
CP-2(Switch)PCB
RF converter
VD-1 (NAP system)PCB
OP-1 (Controls) PCB

* VD-1(NAP system)PCB is installed on Model SLV-X3ME, SLV-X3PS and SLV-X3.

Fig. 1-1

1-2. LOCATION FOR TAPE PATH ADJUSTMENT

NOTE : Test point J1021 (SW-Pulse) and J1023 (Envelope signal) for tape path adjustment is shown in Fig. 2-2-1 on page 4. For adjustment, refer to the separate volume "Mechanism Service Technical Information".

2. ELECTRICAL ADJUSTMENT

2-1. PREPARATION

2-1-1. EQUIPMENT

- Colour TV monitor
- PAL Colour-bar generator (with RF and LINE OUTPUT)
- Audio signal generator
- Oscilloscope (dual trace; frequency response: 10MHz or more; probe: 10:1)
- Frequency counter (countable to 10MHz or higher)
- Digital voltmeter
- AC voltmeter
- In/output probes
- Alignment cassette (VHJ-0008) PAL Colour bar 1KHz
- Alignment cassette (VHJ-0009) Monoscope 6KHz
- Alignment cassette (VHJ-0006) Monoscope 7KHz
- Alignment cassette (VHJ-0051) Check for D.O.C.
- Alignment cassette (VHJ-0023) PAL Monoscope 6KHz, PAL Colour-bar 1KHz, SECAM Colour-bar 1KHz, PAL RF Sweep MESECAM Colour-bar 1KHz, NTSC Colour-bar 1KHz.

2-1-2. SET-UP

Because the RF input signal is used for circuit adjustments, connect the colour-bar generator to the ANT IN terminal of the VCR. The RF input signal is processed by the tuner and IF circuit. It is important that the video output signal of the IF circuit satisfies the items shown in Fig.2-1-1.Connect the oscilloscope to the VIDEO OUTPUT terminal of the video circuit and terminate with a 75Ω load, and then check the video output signal.

- The amplitude of the sync signal should be approximately 0.3 Vp-p.
- The amplitude of the video signal should be approximately 0.7 Vp-p.
- While observing the oscilloscope or TV screen, make fine-tuning adjustments so that the colour burst amplitude is approximately 0.3 Vp-p.
- Check to be sure that there is no spike noise in the sync part of the horizontal sync signal.

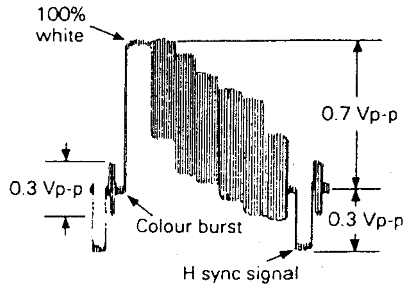
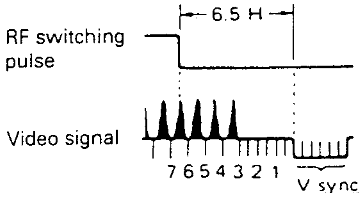
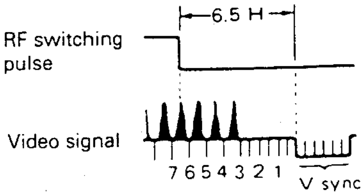


Fig. 2-1-1

2-2. SERVO CIRCUIT ADJUSTMENT ..... CP-1 PCB

NOTE (1) : These adjustments should be carried out upon completion of the transport adjustments.
(2) : If the tape transport adjustments are carried out after these adjustments, follow the procedures again in SWITCHING POSITIONS.
(3) : No. 2 adjustment apply to Model SLV-X3ME, SLV-X3PS and SLV-X3.

No.	Item	Input	Mode	Point	Location	Remark
1	SWITCHING POSITION for PAL SYSTEM	Alignment cassette (VHJ-0009 or VHJ-0023)	PLAY	VIDEO OUTPUT J2015 RF SW pulse J1021	VR351	 6.5 H RF switching pulse Video signal 7 6 5 4 3 2 1 V sync 1. Press the tracking control (+) (–) buttons simultaneously to the center position (on the display "T —:— "). 2. Adjust VR351 so that the phase of the leading edge of the vertical sync signal is delayed 6.5 ± 0.5 H from the fall of the RF switching pulse waveform.
2	SWITCHING POSITION for NTSC SYSTEM	Alignment cassette (VHJ-0006 or VHJ-0023)	PLAY	VIDEO OUTPUT J2015 RF SW pulse J1021	VR371	 6.5 H RF switching pulse Video signal 7 6 5 4 3 2 1 V sync 1. Press the tracking control (+) (–) buttons simultaneously to the center position (on the display "T —:— "). 2. Adjust VR371 so that the phase of the leading edge of the vertical sync signal is delayed 6.5 ± 0.5 H from the fall of the RF switching pulse waveform.

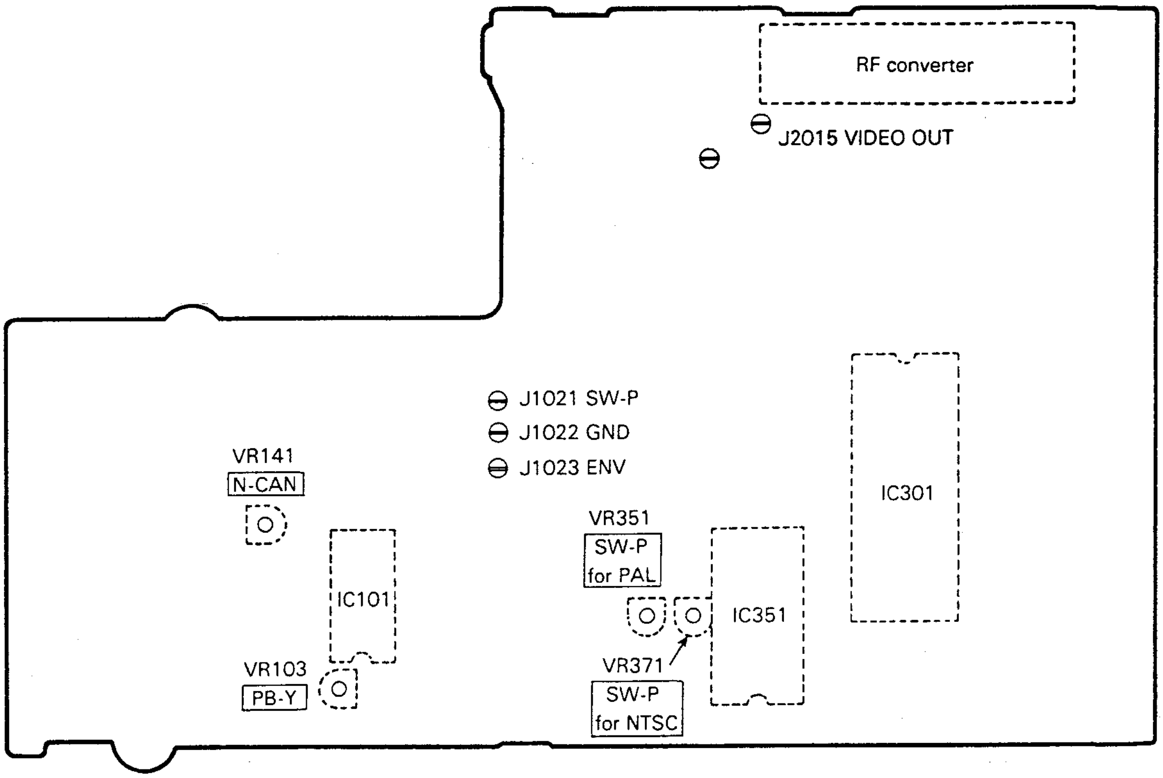
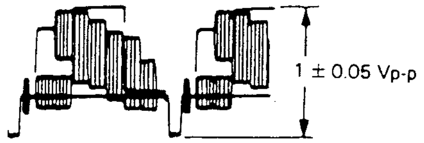
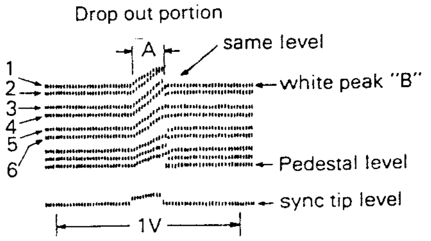

RF converter
J2015 VIDEO OUT
J1021 SW-P
J1022 GND
J1023 ENV
VR141
N-CAN
IC101
VR103
PB-Y
VR351
SW-P
for PAL
VR371
SW-P
for NTSC
IC351
IC301

Fig. 2-2-1 CP-1 PCB (Foil side view)

2-3. VIDEO CIRCUIT ADJUSTMENT ... CP-1 PCB and VD-1 PCB

NOTE : When adjustment No. 2 below, terminate VIDEO OUTPUT TP101 at 75 ohms.

No.	Item	Input	Mode	Point	Location	Remark
1	PB-Y LEVEL	Alignment cassette (VHJ-0008 or VHJ-0023)	PLAY	VIDEO OUTPUT J2015 (CP-1 PCB)	VR103	 1. Adjust VR103 so that the level is 1.00 ± 0.05 Vp-p.
2	N-CAN LEVEL	Alignment cassette (VHJ-0051)	PLAY	VIDEO OUTPUT J2015 (CP-1 PCB)	VR141	 Drop out portion A same level 1 2 3 4 5 6 white peak "B" Pedestal level sync tip level 1V 1. Set the horizontal scale (TIME/DIV) of the oscilloscope to 1 ~ 2 msec./div. and observe the drop out waveform. 2. Turn the horizontal scale to 0.2 msec./div.. 3. Adjust VR141 so that the drop out portion "A" of 4th waveform and other white peak "B" are same level.
3	VCO FREQUENCY	Alignment cassette (VHJ-0008)	PLAY	J1907	VR191	1. Connect a lead wire between J1908 and J1909 of the VD-1 PCB. 2. Adjust VR191 so that the frequency is 15.75 KHz ± 0.5 KHz. 3. Remove a lead wire.

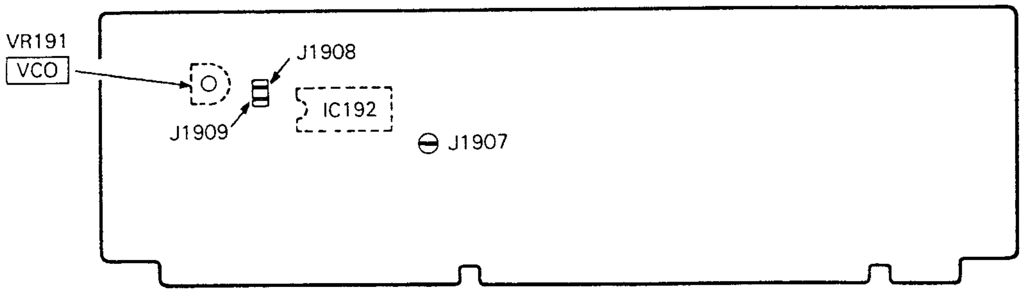

VR191
VCO
J1908
J1909
IC192
J1907

Fig. 2-3-1 VD-1 PCB (Parts side view)

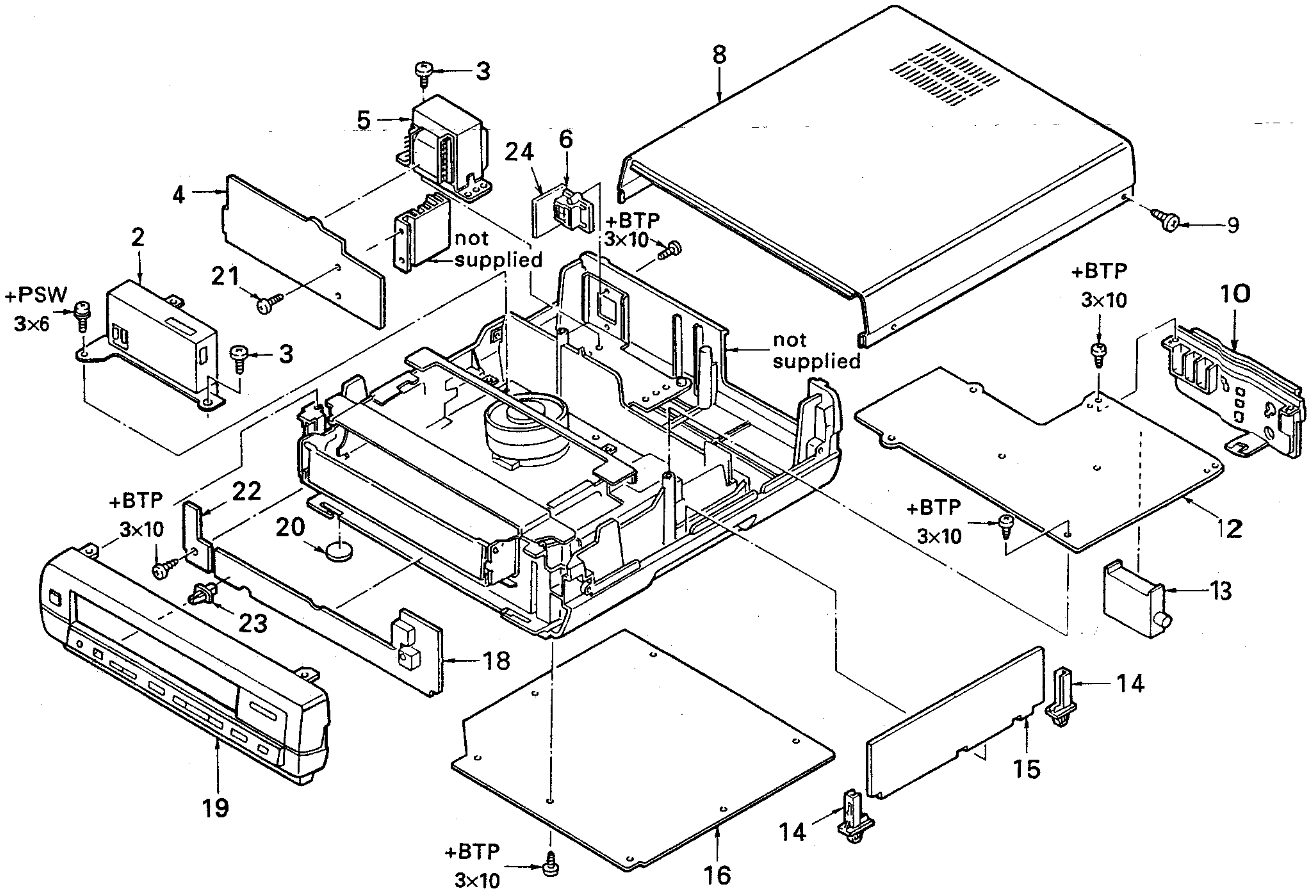
SECTION 7
EXPLODED VIEW

NOTE:

- -XX, -X mean standard parts, so they may have some differences from the original one.
- The construction parts of an assembled part are indicated with a collation number in the remark column.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.

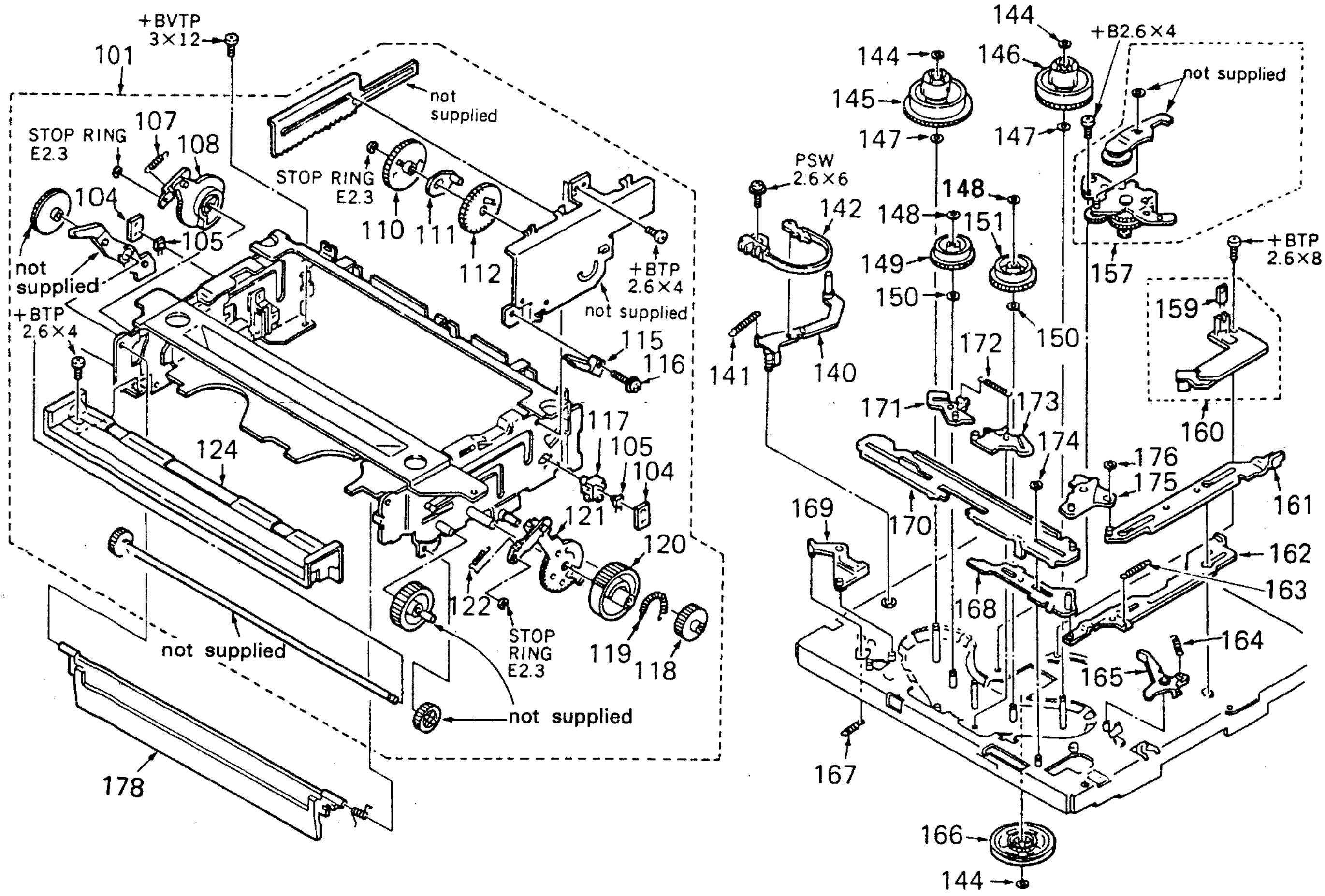
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

7-1. CABINET & CHASSIS PARTS



No.	Part No.	Description	Remark
2	*A-6725-985-A	VP-1 BOARD, COMPLETE	
3	7-685-661-19	SCREW +BVTP 4X12 TYPE2 N-S	
4	*A-6725-988-A	PW-1 BOARD, COMPLETE	
5	⚠.1-450-278-11	TRANSFORMER, POWER (T5001)	
6	⚠.1-580-452-11	CONNECTOR INLET	
8	3-940-381-01	COVER, TOP	
9	3-740-382-01	+BTS-B S 4X12	
10	1-535-875-11	TERMINAL	
12	*A-6725-999-A	CP-1 BOARD, COMPLETE (SLV-X1/X1PS)	
	*A-6756-015-A	CP-1 BOARD, COMPLETE (SLV-X3ME)	
12	*A-6756-006-A	CP-1 BOARD, COMPLETE (SLV-X1ME)	
	*A-6756-010-A	CP-1 BOARD, COMPLETE (SLV-X3/X3PS)	
13	⚠.1-466-258-11	MODULATOR, RF (SLV-X1ME/X3ME)	
	⚠.1-466-442-11	MODULATOR, RF (SLV-X1/X1PS/X3/X3PS)	
14	*3-940-518-01	HOLDER (NAP PCB) (SLV-X3/X3ME/X3PS)	
15	*A-6756-008-A	VD-1 BOARD, COMPLETE (SLV-X3/X3ME/X3PS)	
16	*3-940-378-01	COVER, BOTTOM (SLV-X1PS/X3PS)	
	*3-940-419-01	COVER, BOTTOM (SLV-X1/X1ME/X3/X3ME)	
18	*A-6725-986-A	OP-1 BOARD, COMPLETE (SLV-X1/X1ME/X1PS)	
	*A-6756-009-A	OP-1 BOARD, COMPLETE (SLV-X3/X3ME/X3PS)	
19	A-6704-479-A	CABINET ASSY, FRONT (SLV-X1PS)	
19	A-6704-481-A	CABINET ASSY, FRONT (SLV-X1ME)	
	A-6704-483-A	CABINET ASSY, FRONT (SLV-X1)	
	A-6704-485-A	CABINET ASSY, FRONT (SLV-X3PS)	
	A-6704-487-A	CABINET ASSY, FRONT (SLV-X3ME)	
	A-6704-489-A	CABINET ASSY, FRONT (SLV-X3)	
20	3-940-394-01	STAND	
21	7-685-546-19	SCR S-TPG BIN 3X8	
22	*A-6725-987-A	OP-2 BOARD, COMPLETE	
23	3-940-393-01	KNOB (SLIDE SW)	
24	⚠.*A-6725-989-A	PW-2 BOARD, COMPLETE	

7-2. MECHANISM PARTS 1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STOP RING
E2.3
107
108
104
105
not
supplied
+BTP
2.6×4
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supplied
STOP RING
E2.3
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+BTP
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not supplied
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STOP
RING
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not supplied
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+B2.6×4
not supplied
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PSW
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+BTP
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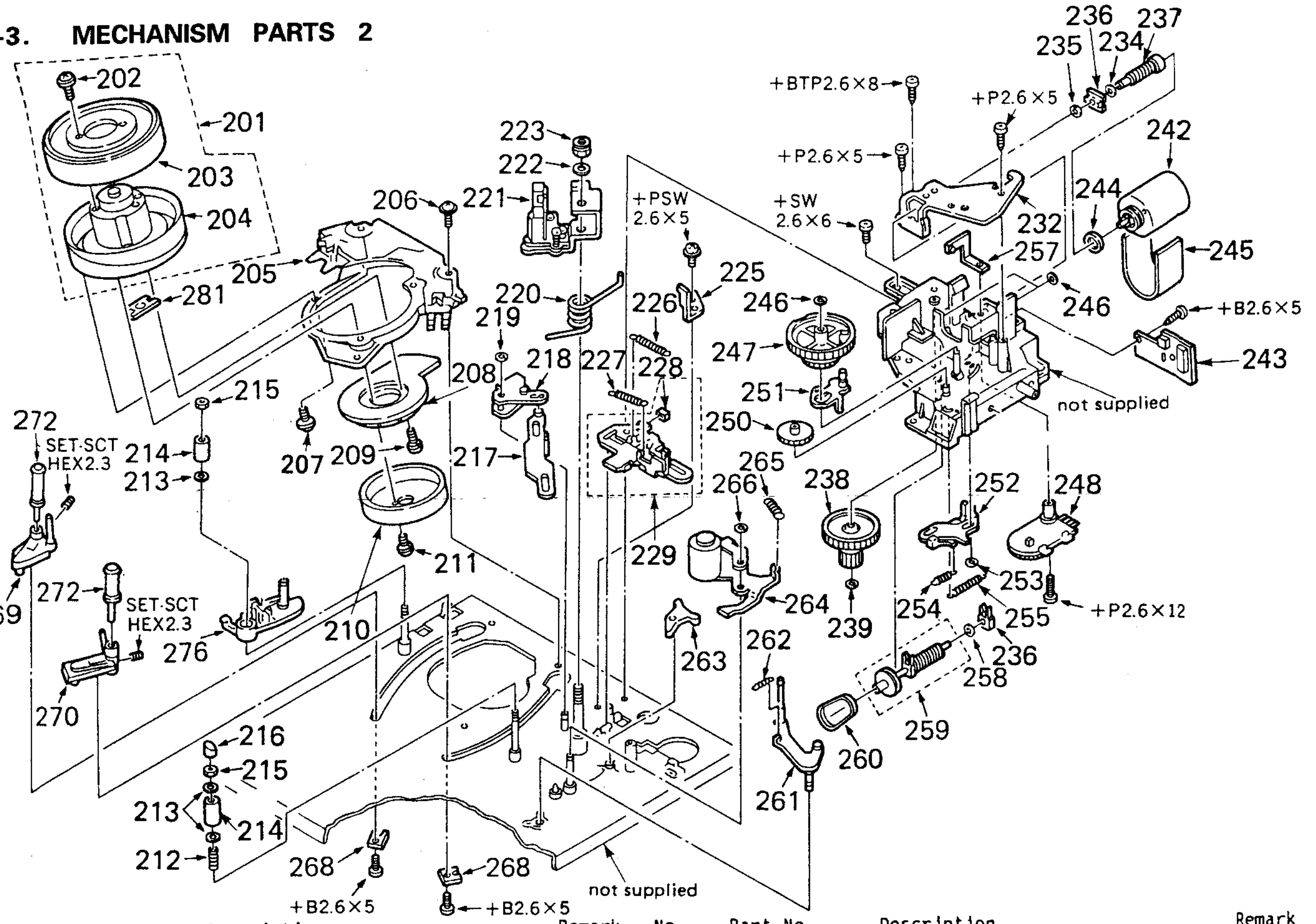
No.	Part No.	Description	Remark
101	A-6751-415-A	CASSETTE COMPARTMENT ASSY	
104	3-735-734-01	LID	
105	1-808-710-11	PHOTO TRANSISTOR	
107	3-735-720-01	SPRING	
108	3-735-719-01	LEVER (L) ASSY, GEAR	
110	3-735-731-01	GEAR, LOCK	
111	3-735-732-01	LEVER ASSY, PINION	
112	3-735-730-01	GEAR, PINION	
115	3-735-729-01	SW, LEAF	
116	3-735-775-01	SCREW (2X9), +PSW	
117	*3-735-733-01	HOLDER, TR	
118	3-735-728-01	GEAR, IDLER	
119	3-735-725-01	SPRING	
120	3-735-724-01	GEAR, MAIN	
121	3-735-723-01	GEAR ASSY, LEVER	
122	3-735-726-01	SPRING	
124	3-735-716-01	FRAME, LOWER	
140	3-740-352-01	LEVER ASSY, TENSION	
141	3-735-654-01	SPRING	
142	3-735-690-01	HOLDER ASSY, BAND	
144	3-735-755-01	WASHER (DIA. 2.6)	
145	3-735-624-01	REEL ASSY, SUPPPLY	
146	3-735-623-01	REEL ASSY, TAKE-UP	
147	3-735-752-01	WASHER (DIA. 3), ADJUSTMENT	
147	3-735-753-01	WASHER (DIA. 3), ADJUSTMENT	
147	3-735-754-01	WASHER (DIA. 3), ADJUSTMENT	
148	3-735-751-01	WASHER (DIA. 2)	
149	3-735-620-01	GEAR, SUPPLY REEL	
150	3-735-750-01	WASHER (DIA. 2.6), SPECIAL	
151	3-735-621-01	GEAR, TAKE-UP REEL	
157	X-3740-301-1	CLUTCH ASSY, IDLER	
159	1-808-722-11	DIODE LN59 (LED)	
160	*1-589-222-11	PCB ASSY, MC-4	
161	*3-735-662-01	PLATE ASSY, SLIDE	
162	*3-735-626-01	BRAKE (C) ASSY	
163	3-735-627-01	SPRING	
164	3-735-665-01	SPRING	
165	3-740-349-01	BRAKE SUB ASSY, T	
166	3-735-652-01	PULLEY	
167	3-740-348-01	SPRING SUB SUPPLY	
168	*3-735-628-01	BRAKE, SLIDE ACT	
169	3-735-655-01	BRAKE SUB, S	
170	*3-735-661-01	PLATE ASSY, SLIDE	
171	3-735-656-01	BRAKE ASSY, S	
172	3-735-658-01	SPRING	
173	3-735-657-01	BRAKE ASSY, T	
174	3-735-761-01	WASHER (DIA. 2.6)	
175	3-735-663-01	LEVER, CONTROL	
176	3-746-725-01	WASHER (DIA. 2)	
178	3-940-387-01	DOOR, CASSETTE	

7-3. MECHANISM PARTS 2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+P2.6×5
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+PSW 2.6×5
+SW 2.6×6
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SET-SCT HEX2.3
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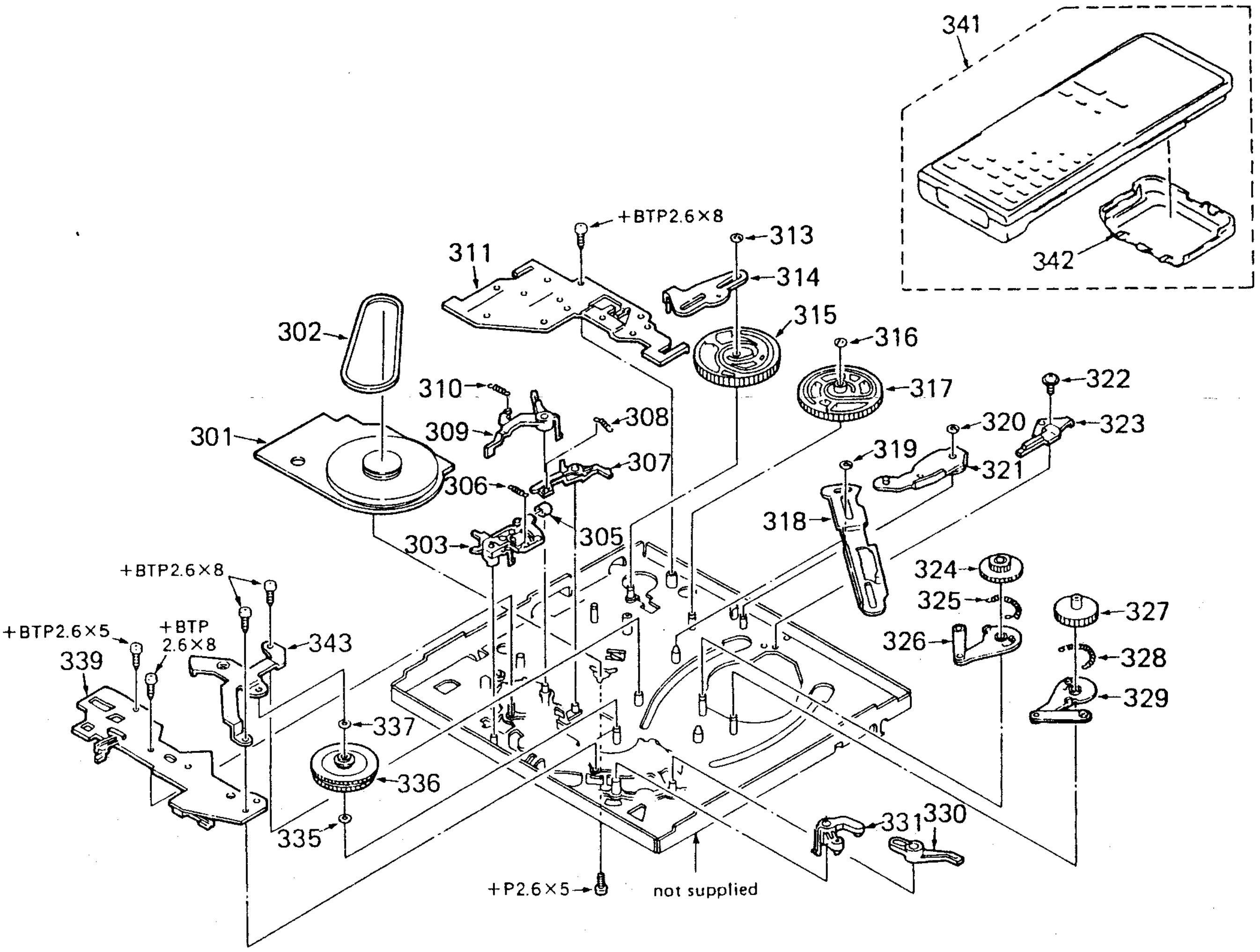
not supplied

No.	Part No.	Description	Remark
201	A-6050-671-A	CYLINDER BOARD, COMPLETE (2N2P-V) (SLV-X1/X1ME/X1PS)	
201	A-6050-735-A	CYLINDER BOARD, COMPLETE (2N2P-D) (SLV-X3/X3ME/X3PS)	
202	3-735-776-01	SCREW (3X8), +PW	
203	3-740-375-01	CYLINDER (UPPER) ASSY	
204	3-735-735-01	CYLINDER (LOWER) ASSY	
205	*3-735-737-01	CYLINDER BASE	
206	3-740-398-01	SCREW (3X6), +PWH	
207	3-735-777-01	SCREW (2.6X8), +PWH	
208	1-462-284-11	STATOR	
209	3-735-779-01	SCREW (2.3X8), +PSW	
210	*1-461-017-11	ROTOR	
211	3-735-778-01	SCREW (2.3X6), +PSW	
212	3-735-677-01	SPRING	
213	3-741-408-01	WASHER, SPECIAL	
214	3-735-676-01	GUIDE, TAPE	
215	3-735-768-01	NUT (M3), SPECIAL	
216	3-740-328-01	CAP	
217	*3-735-672-01	SLIDE ASSY, PINCH	
218	*3-735-673-01	PINCH LEVER ASSY	
219	3-735-759-01	WASHER (DIA. 3)	
220	3-735-680-01	SPRING	
221	3-940-399-01	BRACKET, COMPL.	
222	3-741-409-01	SPACER	
223	3-735-682-01	NUT (M5), SPECIAL	
225	*3-735-683-01	BRACKET, STOPPER	
226	3-735-669-01	SPRING	
227	3-735-670-01	SPRING	
228	3-735-668-01	DAMPER	
229	3-735-667-01	CAM ASSY, SLIDE	
230	3-735-711-01	SENSOR ASSY, DEW	
232	*3-740-356-01	BRACKET, HOLDER	
234	3-740-357-01	WASHER (DIA. 2.1)	
235	3-741-412-01	SPECIAL WASHER	
236	3-735-696-01	HOLDER, WORM	
237	3-735-706-01	WORM ASSY, F	
238	3-740-361-01	GEAR ASSY, HELICAL	
239	3-740-367-01	WASHER (DIA. 3)	
242	3-735-707-01	MOTOR ASSY, L	
243	1-589-321-11	PC BOARD ASSY, MC-3	
244	3-735-708-01	DAMPER, WORM	
245	*3-740-358-01	DAMPER, MOTOR	
246	3-735-773-01	WASHER (DIA. 4)	
247	3-735-703-01	GEAR (F), HELICAL	
248	1-572-383-01	SWITCH, ROTARY	
250	3-735-704-01	GEAR	
251	*3-740-366-01	LEVER, FRONT	
252	3-740-362-01	SLIDE ASSY, F	
254	3-740-363-01	SPRING	
255	3-740-364-01	SPRING	
257	3-740-354-01	PLATE, NUT	
258	3-735-774-01	WASHER (DIA. 2)	
259	3-740-359-01	GEAR ASSY, WORM	
260	3-735-709-01	BELT (LOADING)	
261	3-749-023-01	LEVER ASSY, REV (G)	
262	3-735-660-01	SPRING	
263	3-735-671-01	LEVER, ACT BRAKE	
264	3-735-674-01	PINCH ROLLER, COMPL.	
265	3-735-675-01	SPRING	
266	3-735-757-01	WASHER (DIA. 3.6)	
268	3-735-631-01	PLATE, GUIDE	
269	3-735-629-01	ROLLER (S) ASSY, BASE	
270	3-735-632-01	ROLLER (T) ASSY, BASE	
272	3-735-630-01	ROLLER ASSY, GUIDE	
276	3-747-605-01	LEVER ASSY, FE HEAD	
281	3-735-738-01	SPACER, MOTOR	
282	3-741-413-01	HOLDER, WORM	
283	3-740-365-01	DAMPER, MOTOR	

7-4. MECHANISM PARTS 3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+BTP2.6×5
+BTP 2.6×8
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No.	Part No.	Description	Remark
301	3-740-369-01	MOTOR, CAPSTAN	
302	3-735-691-01	BELT (REEL DRIVE)	
303	3-735-644-01	CLUTCH ASSY, LEVER	
305	3-735-645-01	DAMPER, LEVER CLUTCH	
306	3-735-646-01	SPRING	
307	3-735-647-01	LEVER, CONVERSION CLUTCH	
308	3-735-648-01	SPRING	
309	3-740-350-01	BRAKE ASSY, CAP	
310	3-740-351-01	SPRING	
311	*3-735-692-01	BRACKET	
313	3-735-759-01	WASHER (DIA. 3)	
314	*3-735-643-01	PLATE ASSY, CAM	
315	3-735-639-01	CAM, MODE	
316	3-735-756-01	WASHER (DIA. 3)	
317	3-735-640-01	CAM, MAIN	
318	3-735-642-01	RACK, LOAD	
319	3-735-758-01	WASHER (DIA. 2.6)	
320	3-735-757-01	WASHER (DIA. 3.6)	
321	3-735-641-01	LEVER ASSY, LOAD CAM	
322	3-735-772-01	SCREW (3X4), +PWH	
323	3-735-693-01	PLATE ASSY, GROUND	
324	3-735-638-01	GEAR (T)	
325	3-735-637-01	SPRING (T)	
326	3-735-636-01	LOAD (T) ASSY, LEVER	
327	3-746-724-01	GEAR (S)	
328	3-735-634-01	SPRING	
329	3-735-633-01	LOAD (S) ASSY, LEVER	
330	3-735-766-01	LEVER, RETURN TENSION	
331	3-740-368-01	LEVER ASSY, CONTROL	
335	3-735-760-01	WASHER (DIA. 3), SPECIAL	
336	3-741-402-01	GEAR ASSY, FRICTION	
337	3-735-755-01	WASHER (DIA. 2.6)	
339	*1-589-311-11	COMPL, MC-1	
339-1	1-571-931-11	SWITCH, LEAF (FRONT LOADING) (MC-1)	
339-2	1-571-932-11	SWITCH, LEAF (ERASURE-PREVENSION) (MC-1)	
339-3	1-808-723-11	PHOTO COUPLER (T REEL SENSOR) (MC-1)	
339-4	3-735-744-01	SPACER, PHOTO SENSOR (MC-1)	
341	1-465-612-11	REMOTE CONTROL (RMT-V100B)	
342	2-181-754-01	LID, BATTERY CASE	
343	3-740-397-01	BRACKET PULLEY	

SECTION 8
ELECTRICAL PARTS LIST

VP-1 **OP-2** **PW-1**

NOTE:

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

When indicating parts by reference number, please include the board name.

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX, -X mean standardized parts, so they may have some difference from the original one.
- RESISTORS
  All resistors are in ohrns
  METAL : Metal-film resistor
  METAL OXIDE : Metal Oxide-film resistor
  F : nonflammable
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- SEMICONDUCTORS
  In each case, U : µ, for example:
  UA...: µA..., UPA...: µPA...,
  UPB...: µPB..., UPC...: µPC...,
  UPD...: µPD...
- CAPACITORS
  MF : µF, PF :µµF
- COILS
  MMH : mH, UH : µH

Ref.No	Part No.	Description				Remark
	*A-6725-985-A	VP-1 BOARD, COMPLETE *********************				
		CAPACITOR				
C1805	1-161-043-00	CERAMIC	0.0022MF	10%	50V	
C1806	- - -	CERAMIC	0.0033MF	10%	50V	
C1809	- - -	CERAMIC	0.0033MF	10%	50V	
C1810	1-161-043-00	CERAMIC	0.0022MF	10%	50V	
C1813	1-162-209-31	CERAMIC	27PF	5%	50V	
C1815	1-162-219-31	CERAMIC	68PF	5%	50V	
C1816	1-162-211-31	CERAMIC	33PF	5%	50V	
C1817	1-161-379-00	CERAMIC	0.01MF	20%	25V	
C1823	1-161-039-00	CERAMIC	0.001MF	10%	50V	
C1831	1-126-154-11	ELECT	47MF	20%	6.3V	
C1832	1-161-379-00	CERAMIC	0.001MF	20%	25V	
		CONNECTOR				
CN184	1-580-017-11	SOCKET 5P				
		IC				
IC181	8-759-820-98	IC LA7320				
		COIL				
L1804	1-410-512-11	INDUCTOR	18UH			
L1806	1-410-511-11	INDUCTOR	15UH			
L1807	1-410-518-41	INDUCTOR	56UH			
L1831	1-410-521-11	INDUCTOR	100UH			
		TRANSISTOR				
Q1801	8-729-266-83	TRANSISTOR 2SC2668-Y				
Q1802	8-729-266-83	TRANSISTOR 2SC2668-Y				
Q1803	8-729-266-83	TRANSISTOR 2SC2668-Y				
		RESISTOR				
R1806	1-249-418-11	CARBON	1.2K	5%	1/4W	F
R1807	1-249-421-11	CARBON	2.2K	5%	1/4W	F
R1809	1-249-416-11	CARBON	820	5%	1/4W	F
R1810	1-249-408-11	CARBON	180	5%	1/4W	F
R1811	1-249-414-11	CARBON	560	5%	1/4W	F
R1812	1-247-828-11	CARBON	750	5%	1/4W	
R1813	1-249-412-11	CARBON	390	5%	1/4W	F
R1814	1-249-412-11	CARBON	390	5%	1/4W	F
R1815	1-249-433-11	CARBON	22K	5%	1/4W	F
R1816	1-249-433-11	CARBON	22K	5%	1/4W	F

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Ref.No	Part No.	Description				Remark
	*A-6725-987-A	OP-2 BOARD, COMPLETE *********************				
		SWITCH				
S8901	1-572-415-11	PUSH SWITCH (POWER)				

Ref.No	Part No.	Description				Remark
	*A-6725-988-A	PW-1 BOARD, COMPLETE *********************				
	*3-940-418-01	BRACKET				
	*1-533-238-11	HOLDER, FUSE				
	3-740-374-01	COVER				
	7-685-646-79	SCREW +BTP 3X8 TYPE2 N-S				
	7-685-647-79	SCREW +BVTP 3X10 TYPE2 N-S				
		TRANSISTOR				
B5101	8-729-900-89	TRANSISTOR DTC144ES				
		CAPACITOR				
C5101	1-128-182-11	ELECT	2200MF		50V	
C5102	1-126-105-11	ELECT	1000MF	20%	35V	
C5103	1-128-182-11	ELECT	2200MF	20%	25V	
C5104	1-124-514-11	ELECT	100MF	20%	50V	
C5105	1-123-359-00	ELECT	47MF	20%	35V	
C5106	1-123-875-11	ELECT	10MF	20%	50V	
C5107	1-123-875-11	ELECT	10MF	20%	50V	
C5108	1-123-875-11	ELECT	10MF	20%	50V	
		DIODE				
D5101	8-719-200-02	DIODE 10E2				
D5102	8-719-200-02	DIODE 10E2				
D5103	8-719-200-02	DIODE 10E2				
D5104	8-719-200-02	DIODE 10E2				
D5105	8-719-200-02	DIODE 10E2				
D5106	8-719-200-02	DIODE 10E2				
D5107	8-719-200-02	DIODE 10E2				
D5108	8-719-200-02	DIODE 10E2				
D5109	8-719-200-02	DIODE 10E2				
D5110	8-719-200-02	DIODE 10E2				
D5111	8-719-200-02	DIODE 10E2				
D5112	8-719-200-02	DIODE 10E2				
D5113	1-809-009-11	DIODE 1SS244-T-77				
D5114	8-719-110-41	DIODE RD15ES-B2				
D5115	1-809-207-11	DIODE GZB27C				
D5117	8-719-110-22	DIODE RD11ES-B2				
D5118	8-719-921-48	DIODE MTZJ-5.6C				
D5119	8-719-912-20	DIODE 1SS1120				
		FUSE				
F5001	.1-532-279-00	FUSE, TIME-LAG (T500mA/250)				
F5101	.1-576-116-11	FUSE (T2A/250V)				
		TRANSISTOR				
Q5101	1-809-206-11	TRANSISTOR 2SD1764				
Q5102	1-809-206-11	TRANSISTOR 2SD1764				
Q5103	1-809-206-11	TRANSISTOR 2SD1764				
		RESISTOR				
R5110	.1-212-853-00	FUSIBLE	6.8	5%	1/4W	F

PW-1 PW-2 VD-1 OP-1

Ref.No	Part No.	Description				Remark
R5111	⚠1-212-940-00	FUSIBLE	1.8	5%	1/2W	F

SWITCH

Ref.No	Part No.	Description	Remark
S5001	⚠1-572-563-11	SWITCH, SPECIAL	

TRANSFORMER

Ref.No	Part No.	Description	Remark
T5001	⚠1-450-278-11	TRANSFORMER, POWER	

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*A-6725-989-A PW-2 BOARD, COMPLETE
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Ref.No	Part No.	Description	Remark
	⚠1-580-452-11	CONNECTOR INLET	

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*A-6756-008-A VD-1 BOARD, COMPLETE (SLV-X3/X3ME/X3PS)
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TRANSISTOR

Ref.No	Part No.	Description	Remark
B1901	8-729-900-80	TRANSISTOR DTC114ES	
B1902	8-729-900-80	TRANSISTOR DTC114ES	
B1905	8-729-900-61	TRANSISTOR DTA114ES	
B1906	8-729-900-61	TRANSISTOR DTA114ES	

CAPACITOR

Ref.No	Part No.	Description				Remark
C1901	1-161-021-11	CERAMIC	0.047MF	10%	25V	
C1902	1-124-257-00	ELECT	2.2MF	20%	50V	
C1904	1-126-162-11	ELECT	3.3MF	20%	50V	
C1905	1-130-477-00	MYLAR	0.0033MF	5%	50V	
C1906	1-130-477-00	MYLAR	0.0033MF	5%	50V	
C1907	1-136-165-00	FILM	0.1MF	5%	50V	
C1908	1-161-379-00	CERAMIC	0.01MF	20%	25V	
C1909	1-130-470-00	MYLAR	820PF	5%	50V	
C1910	1-161-379-00	CERAMIC	0.01MF	20%	25V	
C1911	1-126-154-11	ELECT	47MF	20%	6.3V	
C1912	1-161-379-00	CERAMIC	0.01MF	20%	25V	
C1913	1-164-064-11	CERAMIC	56PF	5%	50V	
C1914	1-161-379-00	CERAMIC	0.01MF	20%	25V	
C1915	1-164-064-11	CERAMIC	56PF	5%	50V	
C1916	1-161-379-00	CERAMIC	0.01MF	20%	25V	
C1917	1-101-880-00	CERAMIC	47PF	5%	50V	
C1918	1-161-379-00	CERAMIC	0.01MF	20%	25V	
C1919	1-161-379-00	CERAMIC	0.01MF	20%	25V	
C1921	1-161-379-00	CERAMIC	0.01MF	20%	25V	
C1931	1-126-154-11	ELECT	47MF	20%	6.3V	
C1941	1-126-154-11	ELECT	47MF	20%	6.3V	

DIODE

Ref.No	Part No.	Description	Remark
D1901	8-719-912-20	DIODE 1SS120	
D1904	8-719-912-20	DIODE 1SS120	

IC

Ref.No	Part No.	Description	Remark
IC191	1-809-229-11	IC AN5560	
IC192	1-809-230-11	IC M52063SP	

TRANSISTOR

Ref.No	Part No.	Description	Remark
Q1901	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1902	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1903	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1904	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1906	8-729-119-78	TRANSISTOR 2SC2785-HFE	

VARIABLE RESISTOR

Ref.No	Part No.	Description	Remark
VR191	1-228-994-00	RES, ADJ, CARBON 10K	

`**************************************************************`

*A-6756-009-A OP-1 BOARD, COMPLETE
`********************`

TRANSISTOR

Ref.No	Part No.	Description	Remark
B8801	8-729-900-89	TRANSISTOR DTC144ES	

DIODE

Ref.No	Part No.	Description	Remark
D8801	1-809-208-11	LED PR5505S	
D8802	1-809-209-11	LED EBG5525S	
D8803	1-809-209-11	LED EBG5525S (SLV-X3/X3ME/X3PS)	
D8804	1-809-209-11	LED EBG5525S	

IR RECIEVER PACK

Ref.No	Part No.	Description	Remark
RR881	1-466-241-11	IR RECIEVER PACK	

SWITCH

Ref.No	Part No.	Description	Remark
S8802	1-572-415-11	PUSH SWITCH (EJECT)	
S8803	1-572-415-11	PUSH SWITCH (STILL)	
S8804	1-572-415-11	PUSH SWITCH (FF)	
S8805	1-572-415-11	PUSH SWITCH (REW)	
S8806	1-572-415-11	PUSH SWITCH (PLAY)	
S8807	1-572-415-11	PUSH SWITCH (STOP)	
S8808	1-572-415-11	PUSH SWITCH (TR +)	
S8809	1-572-415-11	PUSH SWITCH (TR -)	
S8820	1-572-416-11	SLIDE SWITCH (ENDLESS)	

VOLUME

Ref.No	Part No.	Description	Remark
VR881	1-241-319-11	VOLUME, ROTARY 10KB (SLV-X3/X3ME/X3PS)	

HOLDER

Ref.No	Part No.	Description	Remark
Y8801	*3-940-404-01	HOLDER (LED FORLED)	

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The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description	Remark
	*A-6756-015-A	CP-1 BOARD, COMPLETE **********************	
	8-729-900-80	TRANSISTOR DTC114ES	(SLV-X3/X3ME/X3PS)

TRANSISTOR

Ref.No	Part No.	Description	Remark
B1080	8-729-900-89	TRANSISTOR DTC144ES	(SLV-X3/X3ME/X3PS)
B3501	8-729-900-89	TRANSISTOR DTC144ES	
B3502	8-729-900-89	TRANSISTOR DTC144ES	
B5401	8-729-900-89	TRANSISTOR DTC144ES	
B5402	8-729-900-89	TRANSISTOR DTC144ES	

CAPACITOR

Ref.No	Part No.	Description			Remark
C1007	1-164-077-11	CERAMIC	220PF	10%	50V
C1008	1-162-293-31	CERAMIC	820PF	10%	50V
C1009	1-124-257-00	ELECT	2.2MF	20%	50V
C1011	1-124-465-00	ELECT	0.47MF	20%	50V
C1012	1-162-211-31	CERAMIC	33PF	5%	50V
C1013	1-162-280-31	CERAMIC	82PF	10%	50V
C1014	1-164-073-11	CERAMIC	100PF	10%	50V
C1015	1-130-493-00	MYLAR	0.068MF	5%	50V
C1016	1-161-379-00	CERAMIC	0.01MF	20%	25V
C1017	1-161-379-00	CERAMIC	0.01MF	20%	25V
C1018	1-161-379-00	CERAMIC	0.01MF	20%	25V
C1019	1-126-154-11	ELECT	47MF	20%	6.3V
C1020	1-124-257-00	ELECT	2.2MF	20%	50V
C1023	1-162-292-31	CERAMIC	680PF	10%	50V
C1025	1-161-379-00	CERAMIC	0.01MF	20%	25V
C1027	1-126-163-11	ELECT	4.7MF	20%	50V
C1029	1-164-077-11	CERAMIC	220PF	10%	50V
C1030	1-161-379-00	CERAMIC	0.01MF	20%	25V
C1043	1-124-767-00	ELECT	2.2MF	20%	50V
C1046	1-164-072-11	CERAMIC	120PF	5%	50V
C1047	1-161-044-00	CERAMIC	0.0027MF	10%	50V
C1050	1-130-499-00	MYLAR	0.22MF 5% 50V		(SLV-X1/X1ME/X1PS)
C1080	1-162-209-31	CERAMIC	27PF	5%	50V
C1091	1-126-114-11	ELECT	470MF	20%	6.3V
C1092	1-124-234-00	ELECT	22MF	20%	16V
C1093	1-124-455-00	ELECT	100MF	20%	16V
C1094	1-161-379-00	CERAMIC	0.01MF	20%	25V
C1101	1-161-494-00	CERAMIC	0.022MF	30%	25V
C1102	1-161-379-00	CERAMIC	0.01MF	20%	25V
C1103	1-124-791-11	ELECT	1MF	20%	100V
C1104	1-161-379-00	CERAMIC	0.01MF	20%	25V
C1105	1-124-791-11	ELECT	1MF	20%	100V
C1106	1-124-791-11	ELECT	1MF	20%	100V
C1107	1-161-494-00	CERAMIC	0.022MF	30%	25V
C1108	1-161-021-11	CERAMIC	0.047MF	10%	25V
C1117	1-161-021-11	CERAMIC	0.047MF	10%	25V
C1118	1-162-214-31	CERAMIC	43PF	5%	50V
C1119	1-162-281-31	CERAMIC	91PF	10%	50V
C1120	1-161-063-00	CERAMIC	0.1MF	10%	50V
C1121	1-124-126-00	ELECT	47MF	20%	10V
C1123	1-161-379-00	CERAMIC	0.01MF	20%	25V
C1125	1-161-379-00	CERAMIC	0.01MF	20%	25V
C1126	1-161-379-00	CERAMIC	0.01MF	20%	25V
C1201	1-102-820-00	CERAMIC	330PF	5%	50V
C1401	1-126-163-11	ELECT	4.7MF	20%	25V
C1402	1-161-379-00	CERAMIC	0.01MF	20%	25V
C1403	1-161-379-00	CERAMIC	0.01MF	20%	25V
C1404	1-126-301-11	ELECT	1MF	20%	50V
C1405	1-101-880-00	CERAMIC	47PF	5%	50V
C1406	1-101-880-00	CERAMIC	47PF	5%	50V
C1407	1-162-195-31	CERAMIC	4.7PF	10%	50V
C1411	1-161-379-00	CERAMIC	0.01MF	20%	25V
C1701	1-161-039-00	CERAMIC	0.001MF	10%	50V
C1702	1-161-039-00	CERAMIC	0.001MF	10%	50V (SLV-X3/X3ME/X3PS)
C1703	1-161-039-00	CERAMIC	0.001MF	10%	50V (SLV-X3/X3ME/X3PS)
C2001	1-130-489-00	MYLAR	0.033MF	5%	50V
C2002	1-124-963-11	ELECT	33MF	20%	16V
C2003	1-124-242-00	ELECT	33MF	20%	16V
C2004	1-162-293-31	CERAMIC	820PF	10%	50V
C2005	1-162-289-31	CERAMIC	390PF	10%	50V
C2006	1-124-252-00	ELECT	0.33MF	20%	50V
C2007	1-126-154-11	ELECT	47MF	20%	6.3V
C2008	1-161-039-00	CERAMIC	0.001MF	10%	50V
C2009	1-126-155-11	ELECT	100MF	20%	6.3V
C2010	1-130-491-00	MYLAR	0.047MF	5%	50V
C2050	1-124-589-11	ELECT	47MF	20%	16V
C3001	1-161-379-00	CERAMIC	0.01MF	20%	25V
C3002	1-161-772-11	CERAMIC	0.1MF	10%	25V
C3003	1-124-257-00	ELECT	2.2MF	20%	50V
C3004	1-124-963-11	ELECT	33MF	20%	16V
C3005	1-161-772-11	CERAMIC	0.1MF	10%	25V
C3006	1-124-443-00	ELECT	100MF	20%	10V
C3007	1-161-772-11	CERAMIC	0.1MF	10%	25V
C3008	1-161-772-11	CERAMIC	0.1MF	10%	25V
C3080	- - -	OS-SOLID	68MF		10V
C3501	1-130-484-00	MYLAR	0.012MF	5%	50V
C3502	1-124-126-00	ELECT	47MF	20%	10V
C3503	1-161-772-11	CERAMIC	0.1MF	10%	25V
C3504	1-162-286-31	CERAMIC	220PF	10%	50V
C3506	1-130-487-00	MYLAR	0.022MF	5%	50V
C3507	1-161-053-00	CERAMIC	0.015MF	10%	50V
C3508	1-161-329-00	CERAMIC	0.0068MF	30%	25V
C3509	1-161-053-00	CERAMIC	0.015MF	10%	50V
C3510	1-124-234-00	ELECT	22MF	20%	16V
C3511	1-124-234-00	ELECT	22MF	20%	16V
C3512	1-130-487-00	MYLAR	0.022MF	5%	50V
C3513	1-136-165-00	FILM	0.1MF	5%	50V
C3514	1-161-048-00	CERAMIC	0.0056MF	10%	50V
C3515	1-161-048-00	CERAMIC	0.0056MF	10%	50V
C3516	1-161-329-00	CERAMIC	0.0068MF	30%	25V
C3517	1-124-234-00	ELECT	22MF	20%	16V

When indicating parts by reference number, please include the board name.

CP-1

Ref.No	Part No.	Description				Remark
C3518	1-124-234-00	ELECT	22MF	20%	16V	
C3519	1-136-167-00	FILM	0.15MF	5%	50V	
C3521	1-161-379-00	CERAMIC	0.01MF	20%	25V	
C3522	1-124-791-11	ELECT	1MF	20%	100V	
C3523	1-162-282-31	CERAMIC	100PF	10%	50V	
C3524	1-130-494-11	MYLAR	0.082MF	5%	50V	
C3525	1-161-039-00	CERAMIC	0.001MF	10%	50V	
C3526	1-130-491-00	MYLAR	0.047MF	5%	50V	
C3527	1-161-039-00	CERAMIC	0.001MF	10%	50V	
C3528	1-124-791-11	ELECT	1MF	20%	100V	
C3529	1-161-061-11	CERAMIC	0.068MF	10%	50V	
C3530	1-124-126-00	ELECT	47MF	20%	10V	
C3531	1-161-039-00	CERAMIC	0.001MF	10%	50V	
C3532	1-123-875-11	ELECT	10MF	20%	50V	
C3533	1-124-126-00	ELECT	47MF	20%	10V	
C3534	1-161-375-00	CERAMIC	0.0022MF	20%	50V	
C3535	1-162-282-31	CERAMIC	100PF	10%	50V	
C3537	1-123-875-11	ELECT	10MF	20%	50V	
C3701	1-161-039-00	CERAMIC	0.001MF	10%	50V	(SLV-X3/X3ME/X3PS)
C3702	1-162-207-31	CERAMIC	22PF	5%	50V	(SLV-X3/X3ME/X3PS)
C3703	1-164-073-11	CERAMIC	100PF	10%	50V	(SLV-X3/X3ME/X3PS)
C3704	1-162-211-31	CERAMIC	33PF	5%	50V	(SLV-X3/X3ME/X3PS)
C3705	1-161-039-00	CERAMIC	0.001MF	10%	50V	(SLV-X3/X3ME/X3PS)
C5401	1-126-154-11	ELECT	47MF	20%	6.3V	
C6601	1-124-126-00	ELECT	47MF		10V	
C6602	1-124-126-00	ELECT	47MF		10V	(SLV-X1ME/X3ME)

CONNECTOR

CN101	1-569-069-11	SOCKET 5P	
CN302	1-580-019-11	SOCKET 4P	
CN303	1-569-071-11	SOCKET 6P	
CN351	1-580-018-11	SOCKET 6P	
CN352	1-580-020-11	SOCKET 8P	
CN541	1-580-011-11	SOCKET 8P	

DIODE

D1004	8-719-911-19	DIODE 1SS119	
D1080	8-719-911-19	DIODE 1SS119	
D1081	8-719-912-20	DIODE 1SS120	(SLV-X3/X3ME/X3PS)
D1401	8-719-911-19	DIODE 1SS119	
D1701	8-719-911-19	DIODE 1SS119	(SLV-X3/X3ME/X3PS)
D1702	8-719-912-20	DIODE GMA01	(SLV-X3/X3ME/X3PS)
D2003	8-719-912-20	DIODE 1SS120	
D3001	8-719-109-89	DIODE RD5.6ESB2	
D3002	8-719-110-08	DIODE RD8.2ESB2	
D3003	8-719-912-20	DIODE 1SS120	
D3004	8-719-912-20	DIODE 1SS120	
D3501	8-719-911-19	DIODE 1SS119	
D3502	8-719-911-19	DIODE 1SS119	
D3503	8-719-911-19	DIODE 1SS119	
D3504	8-719-911-19	DIODE 1SS119	
D3505	8-719-911-19	DIODE 1SS119	
D3506	8-719-911-19	DIODE 1SS119	
D3701	8-719-912-20	DIODE 1SS120	(SLV-X3/X3ME/X3PS)
D3703	8-719-912-20	DIODE 1SS120	(SLV-X3/X3ME/X3PS)
D3901	8-719-912-20	DIODE 1SS120	(SLV-X3/X3ME/X3PS)

DEILAY LINE

DL111	1-415-707-11	DELAY	
DL171	1-415-801-11	DEILAY LINE (1H 3.575611MHz)	(SLV-X3/X3ME/X3PS)

IC

IC101	8-759-821-84	IC LA7340S
IC111	8-759-822-29	IC LA7332
IC141	8-759-821-51	IC LC8992
IC201	8-759-800-36	IC LA3160
IC301	1-809-212-11	IC LC66506B-4488
IC302	8-759-822-09	IC LB1641
IC303	8-759-103-93	IC UPC393C
IC304	8-759-403-44	IC MN1280-S
IC331	1-809-211-11	IC LC6527H-4450
IC351	1-809-210-11	IC LC7416-8093
IC352	1-808-716-11	IC LA7116

JACK

JK101	1-580-426-11	SOCKET (VD OUT RCA)
JK201	1-580-425-11	SOCKET (AD OUT RCA WHITE)

COIL

L1002	1-410-521-11	INDUCTOR	100UH
L1005	1-412-269-11	CHOKE, HF	2.2mH
L1006	1-410-519-11	INDUCTOR	68UH
L1102	1-410-512-11	INDUCTOR	18UH
L1103	1-410-322-11	INDUCTOR	3.3UH
L1104	1-410-511-11	INDUCTOR	15UH
L1401	1-410-520-11	INDUCTOR	82UH

TRANSISTOR

Q1002	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1003	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1004	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1006	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1091	8-729-201-53	TRANSISTOR 2SA1015-GR	
Q1104	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1105	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1401	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1402	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q1701	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1702	8-729-119-78	TRANSISTOR 2SC2785-HFE	(SLV-X3/X3ME/X3PS)

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description	Remark
Q1703	8-729-119-78	TRANSISTOR 2SC2785-HFE(SLV-X3/X3ME/X3PS)	
Q2001	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q3701	8-729-119-78	TRANSISTOR 2SC2785-HFE(SLV-X3/X3ME/X3PS)	
Q3702	8-729-119-78	TRANSISTOR 2SC2785-HFE(SLV-X3/X3ME/X3PS)	
Q3703	8-729-119-78	TRANSISTOR 2SC2785-HFE(SLV-X3/X3ME/X3PS)	
Q5401	1-808-850-11	TRANSISTOR 2SA1703-S-AN	

SWITCH

Ref.No	Part No.	Description
S1001	1-572-564-11	SWITCH, SLIDE (2-2)

VARIABLE RESISTOR

Ref.No	Part No.	Description
VR103	1-228-990-00	RES, ADJ, CARBON 1K
VR141	1-228-990-00	RES, ADJ, CARBON 1K
VR351	1-228-998-00	RES, ADJ, METAL GLAZE 220K
VR371	1-228-998-00	RES, ADJ, METAL GLAZE 220K (SLV-X3/X3ME/X3PS)

CRYSTAL

Ref.No	Part No.	Description
X1101	1-577-667-11	CRYSTA, OSC
X3701	1-579-082-11	CRYSTAL 3.579545KHz (SLV-X3/X3ME/X3PS)

LC PACK

Ref.No	Part No.	Description
XF101	1-236-602-11	LC PACK (L.P.F 3MHz)
XF111	1-236-603-11	LC PACK (B.P.F 5.06MHz) (L.D.P 1.4MHz)(B.P.F 4.43MHz)
XF301	1-577-682-11	RESONATOR, CERAMIC
XF331	1-577-682-11	RESONATOR, CERAMIC

INDICATOR

Ref.No	Part No.	Description
YO002	*3-940-420-01	INDICATOR (TERMINAL)
YO003	3-741-422-01	PCB SUPPORT-6.5
YO004	3-741-422-01	PCB SUPPORT-6.5

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MISCELLANEOUS

Part No.	Description
A-6050-671-A	COMPLETE PCB, CYLINDER (2N2P-V) (SLV-X1/X1ME/X1PS)
A-6050-735-A	COMPLETE PCB, CYLINDER (2N2P-D) (SLV-X3/X3ME/X3PS)
⚠ 1-450-278-11	TRANSFORMER, POWER (T5001)
⚠ 1-466-258-11	MODULATOR, RF (SLV-X1ME/X3ME)
⚠ 1-466-442-11	MODULATOR, RF (SLV-X1/X1PS/X3/X3PS)
1-808-710-11	PHOTO TRANSISTOR
1-808-722-11	DIODE LN59 (LED)
3-735-729-01	SW, LEAF
3-740-369-01	MOTOR, CAPSTAN

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ACCESSORIES AND PACKING MATERIALS

Part No.	Description	Remark
1-465-612-11	REMOTE COMMANDER (3 LINE)	
1-569-008-11	PLUG (POWER CORD)	
⚠ 1-590-224-11	CORD, POWER	
3-749-104-01	CABLE, ANT	
3-752-471-01	MANUAL, INSTRUCTION (SLV-X1PS/X3PS) (ENGLISH, CHINESE)	
3-752-472-01	MANUAL, INSTRUCTION(SLV-X1/X1ME/X3/X3ME) (ENGLISH, SPANISH, ARABIC)	
*3-940-388-01	INDIVIDUAL CARTON (SLV-X1PS)	
*3-940-389-01	CUSHION (INNER FRONT)	
*3-940-390-01	CUSHION (INNER BACK)	
*3-940-422-01	INDIVIDUAL CARTON (SLV-X1ME)	
*3-940-426-01	INDIVIDUAL CARTON (SLV-X1)	
*3-940-523-01	INDIVIDUAL CARTON (SLV-X3PS)	
*3-940-526-01	INDIVIDUAL CARTON (SLV-X3ME)	
*3-940-530-01	INDIVIDUAL CARTON (SLV-X3)	

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HARDWARE LIST

Part No.	Description
7-621-759-45	+PSW, 2.6X6

SET-SCT

Part No.	Description
7-621-732-08	SET-SCT, HEX. 2X3 FLAT POINT

SCREW

Part No.	Description
7-621-775-10	SCREW +B 2.6X4
7-621-775-20	SCREW +B 2.6X5
7-682-547-09	SCREW +B 3X6
7-682-947-01	SCREW +PSW 3X6
7-685-131-19	SCREW +BTP 2.6X4 TYPE2 N-S
7-685-534-19	SCREW +BTP 2.6X8 TYPE2 N-S
7-685-647-79	SCREW +BTP 3X10 TYPE2 N-S
7-685-647-79	SCREW +BVTP 3X10 TYPE2 SLIT
7-685-661-19	SCREW +BVTP 4X12 TYPE2 N-S
7-685-133-19	SCREW, TOTSU PTP 2.6X6 TYPE2

STOP RING

Part No.	Description
7-624-105-04	STOP RING 2.3, TYPE -E

WASHER

Part No.	Description
7-688-001-01	W 2, SMALL

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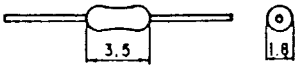
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

Description

	5%	1/4W	A
CARBON RESISTOR	5%	1/4W	



Value	Part. No.	Value	Part. No.	Value	Part. No.	Value	Part. No.	Value	Part. No.	Value	Part. No.
0.22Ω		11Ω	1-247-784-00	200Ω	1-247-814-11	3.6kΩ	1-247-844-11	62kΩ	1-247-874-11	1.2MΩ	
0.27Ω		12Ω	1-249-394-11	220Ω	1-249-409-11	3.9kΩ	1-249-424-11	68kΩ	1-249-439-11	1.5MΩ	
0.33Ω		13Ω	1-247-786-11	240Ω	1-247-816-11	4.3kΩ	1-247-846-11	75kΩ	1-247-876-11	1.8MΩ	
0.39Ω		15Ω	1-249-395-11	270Ω	1-249-410-11	4.7kΩ	1-249-425-11	82kΩ	1-249-440-11	2.0MΩ	
0.47Ω	1-249-377-11	16Ω	1-247-788-00	300Ω	1-247-818-11	5.1kΩ	1-247-848-11	91kΩ	1-247-878-00	2.2MΩ	1-259-880-11
0.56Ω	1-249-378-11	18Ω	1-249-396-11	330Ω	1-249-411-11	5.6kΩ	1-249-426-11	100kΩ	1-249-441-11	2.7MΩ	
0.68Ω	1-249-379-11	20Ω	1-247-790-11	360Ω	1-247-820-11	6.2kΩ	1-247-850-11	110kΩ	1-247-880-11	3.3MΩ	
0.82Ω	1-249-380-11	22Ω	1-249-397-11	390Ω	1-249-412-11	6.8kΩ	1-249-427-11	120kΩ	1-247-881-00	3.9MΩ	
1.0Ω	1-249-381-11	24Ω	1-247-792-11	430Ω	1-247-822-11	7.5kΩ	1-247-852-11	130kΩ	1-247-882-11	4.7MΩ	
1.2Ω	1-249-382-11	27Ω	1-249-398-11	470Ω	1-249-413-11	8.2kΩ	1-249-428-11	150kΩ	1-247-883-00	5.6MΩ	
1.5Ω	1-249-383-11	30Ω	1-247-794-11	510Ω	1-249-442-11	9.1kΩ	1-247-854-11	160kΩ	1-247-884-11	6.8MΩ	
1.6Ω		33Ω	1-249-399-11	560Ω	1-249-414-11	10kΩ	1-249-429-11	180kΩ	1-247-885-00	8.2MΩ	
1.8Ω	1-249-384-11	36Ω	1-247-796-11	620Ω	1-247-826-00	11kΩ	1-247-856-00	200kΩ	1-247-886-11	10MΩ	
2.2Ω	1-249-385-11	39Ω	1-249-400-11	680Ω	1-249-415-11	12kΩ	1-249-430-11	220kΩ	1-247-887-00	12MΩ	
2.4Ω	1-247-768-00	43Ω	1-247-798-11	750Ω	1-247-828-11	13kΩ	1-247-858-11	240kΩ	1-247-888-11	15MΩ	
2.7Ω	1-249-386-11	47Ω	1-249-401-11	820Ω	1-249-416-11	15kΩ	1-249-431-11	270kΩ	1-247-889-00	18MΩ	
3.0Ω	1-247-770-00	51Ω	1-247-800-11	910Ω	1-247-830-11	16kΩ	1-247-860-11	300kΩ	1-247-890-11	22MΩ	
3.3Ω	1-249-387-11	56Ω	1-249-402-11	1.0kΩ	1-249-417-11	18kΩ	1-249-432-11	330kΩ	1-247-891-00		
3.6Ω	1-247-772-00	62Ω	1-247-802-11	1.1kΩ	1-247-832-11	20kΩ	1-247-862-11	360kΩ	1-247-892-11		
3.9Ω	1-249-388-11	68Ω	1-249-403-11	1.2kΩ	1-249-418-11	22kΩ	1-249-433-11	390kΩ	1-247-893-11		
4.3Ω	1-247-774-00	75Ω	1-247-804-11	1.3kΩ	1-247-834-11	24kΩ	1-247-864-11	430kΩ	1-247-894-11		
4.7Ω	1-249-389-11	82Ω	1-249-404-00	1.5kΩ	1-249-419-11	27kΩ	1-249-434-11	470kΩ	1-247-895-00		
5.1Ω	1-247-776-00	91Ω	1-247-806-11	1.6kΩ	1-247-836-11	30kΩ	1-247-866-11	510kΩ	1-247-896-11		
5.6Ω	1-249-390-11	100Ω	1-249-405-11	1.8kΩ	1-249-420-11	33kΩ	1-249-435-11	560kΩ	1-247-897-11		
6.2Ω	1-247-778-00	110Ω	1-247-808-11	2.0kΩ	1-247-838-00	36kΩ	1-247-868-11	620kΩ	1-247-898-11		
6.8Ω	1-249-391-11	120Ω	1-249-406-11	2.2kΩ	1-249-421-11	39kΩ	1-249-436-11	680kΩ	1-247-899-11		
7.5Ω	1-247-780-00	130Ω	1-247-810-11	2.4kΩ	1-247-840-00	43kΩ	1-247-870-11	750kΩ	1-247-900-11		
8.2Ω	1-249-392-11	150Ω	1-249-407-11	2.7kΩ	1-249-422-11	47kΩ	1-249-437-11	820kΩ	1-247-901-11		
9.1Ω	1-247-782-00	160Ω	1-247-812-11	3.0kΩ	1-247-842-11	51kΩ	1-247-872-11	910kΩ	1-247-902-11		
10Ω	1-249-393-11	180Ω	1-249-408-11	3.3kΩ	1-249-423-11	56kΩ	1-249-438-11	1.0MΩ	1-247-903-00		

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